TECHNOLOGY DEPT.

Coal Age

FEBRUARY, 1945

THE COAL PROBLEM IN 1945

SEE PAGE 86

PROPER LUBRICATION SAVES $1664 A YEAR

SUN LUBRICANTS . . .

Increase Output of Coal-Loader, Reduce Shutdowns

In the heart of the western Pennsylvania coal fields, an operator was having trouble with the lubrication of a "loader." The machine was loading 5' vein coal and operated under extremely wet conditions most of the time. The impurities in the water reacted with the grease, causing it to gum up. The transmission and gathering heads had to be cleaned every two or three days.

Excessive time out reduced the loader's output, until finally the management asked a Sun engineer to help. He analyzed the mine water and other operating conditions after which he recommended a Sun grease. The new grease resisted the impurities and the washing action of the water. The loader now runs two or three weeks between cleanings.

Estimated savings have been $1664 a year for labor alone. In addition, there has been an increase in production and a decrease in amount of grease used. Greases are only one of the quality petroleum products, prepared by Sun for coal-mine equipment. For every application, from vein to tipple, and right on to the consumer, Sun makes a complete line of greases, oils, and coal sprays. Sun petroleum products are designed for every type of power equipment, compressor, hoist, conveyor, or other mine machine. Call in the Sun engineer for expert help.

SUN OIL COMPANY · ***Philadelphia 3, Pa.***

Sponsors of the Sunoco News Voice of the Air — Lowell Thomas

SUNOCO

SUN INDUSTRIAL PRODUCT

OILS FOR AMERICAN INDUST

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MAR 1 1945
DETROIT

Rubber collars for 2-mile necks

A typical example of B. F. Goodrich development in rubber

DRILLING an oil well is really chewing a hole into the earth, sometimes as much as 2 miles down. A sharp bit on the end of a spinning pipe does the chewing. As the hole goes down, its earth sides would collapse, so they line it with pipe called "casing". But this means one steel pipe spinning inside another — they're bound to rub and wear out — that means expensive replacement, long delays, sometimes ruined wells.

An oil man had the idea of snapping rubber bands every 20 or 30 feet on the spinning pipe, to keep it away from the casing. But these bands took a long time to install and then soon stretched and became loose, slipped down, and left the pipes exposed again.

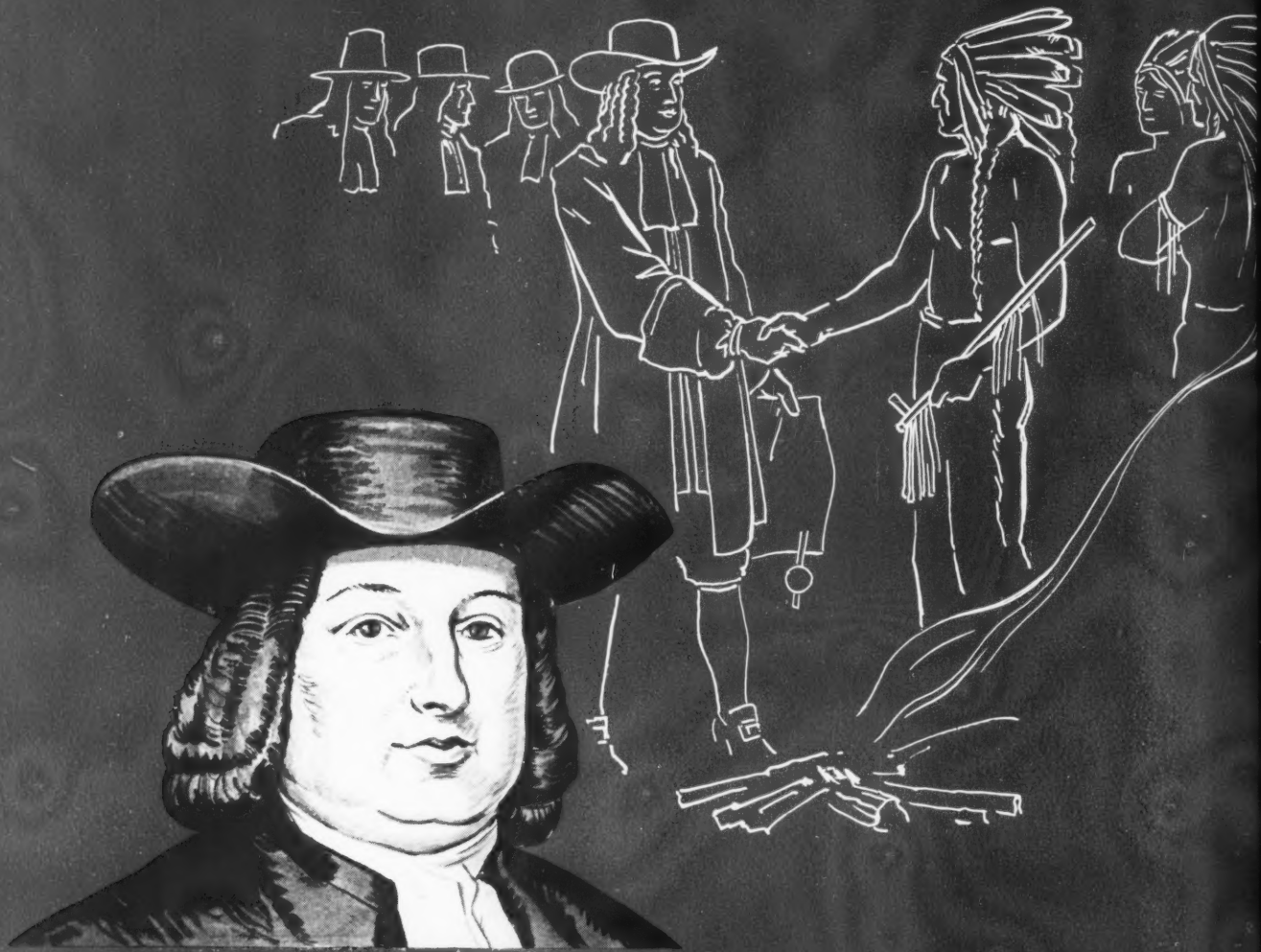
B. F. Goodrich believed the problem could be solved. They developed a different kind of "casing guard" as it is called — a metal ring protected by rubber inside and out but made in two halves so it can be fitted around the pipe. Then a wedge-shaped pin is driven through slots in the metal, binding the ring so tightly to the pipe it cannot slip. This guard is easier and quicker to install, and gives positive protection to the pipe throughout the whole drilling operation.

Longer life, easier use, money saved are typical results for industry of B. F. Goodrich continuous research. Don't be satisfied with any rubber or synthetic product you use until you have found out what improvements B. F. Goodrich has made in it recently. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F. Goodrich

FIRST IN RUBBER

to do one thing and do it



When William Penn, for whom Pennsylvania was named, made his noted treaty with the Indians in 1682, he did the job supremely well. For the Treaty has been idealized by Voltaire as "The only Treaty between those people and the Christians that was not ratified by oath, and was never infringed".

When Hulburt Oil & Grease Company made available its grease a quarter of a century ago, it was accepted by coal mines because it quickly proved its superiority as a Quality lubricating grease. By doing one job—lubricating coal mine equipment—and doing it supremely well, Hulburt grease established a name for itself—and that name is Quality.

HULBURT OIL & GREASE COMPANY . . PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

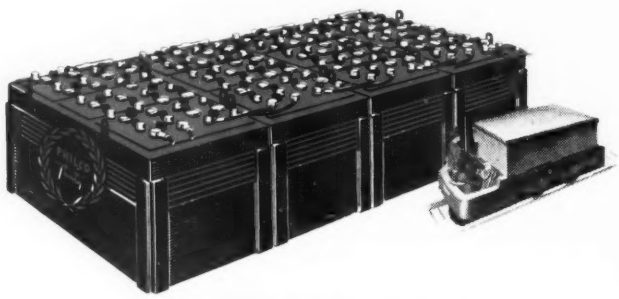
SUPREMELY WELL

HULBURT

Quality GREASE

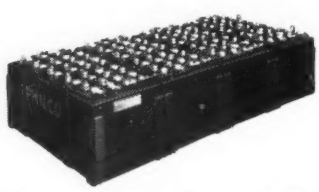
LET PHILCO REDUCE YOUR POST-WAR HAULAGE COSTS

Philco is ready, *today,* with the advanced high-capacity battery performance and long-life economy you'll need in your post-war operations. The complete Philco post-war line includes modern Storage Batteries for all motive power and stationary needs. It will save you dollars in depreciation, up-keep and maintenance costs to specify Philco. Let us send you the latest Philco Battery catalogs of types for your special requirements. PHILCO CORPORATION, Storage Battery Division, Trenton 7, New Jersey.



THE NEW PHILCO "THIRTY"

This outstanding battery for mine locomotives and shuttle cars gives 30% longer life and is identified by its red top. Now available in certain types and limited quantities.



The complete line of Philco Mine Storage Batteries includes modern high-capacity types, of proven long life and economy, for all locomotive and shuttle car equipment.

Specify PHILCO STORAGE BATTERIES

For 50 years a leader in Industrial Storage Battery Development

Coal Age

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Director of Circulation, COAL AGE,
330 West 42d St., New York 18, N. Y.

Please change the address of my COAL AGE subscription as follows:

Name .....

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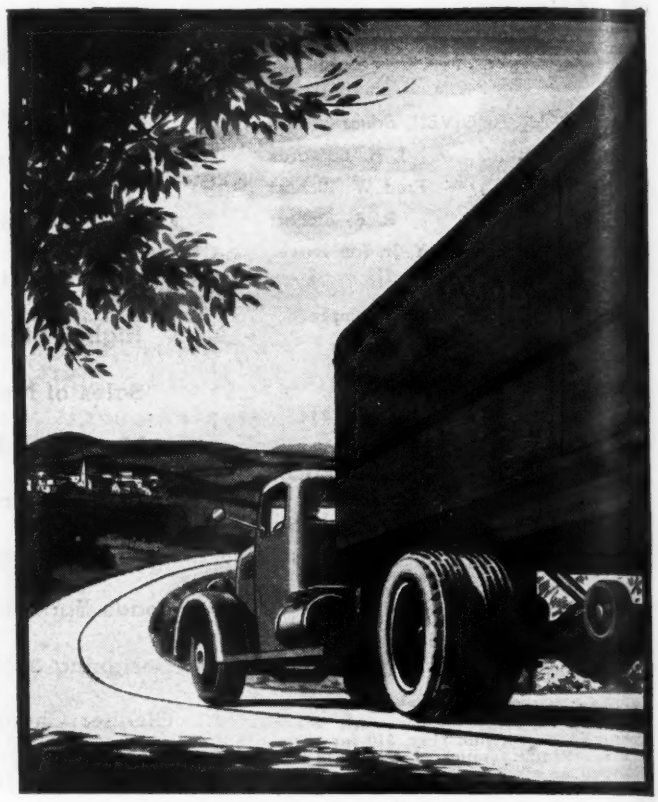
New Title or Position .....

For a Quick Recovery.



"Quick Recovery" is the job of the Heavy Wreckers built by Ward LaFrance for the armed forces. When a tank, truck, or half-track is put out of action, these rugged trucks go out and get them. They bring 'em back through sand, muck and rocky terrain, over nearly impossible trails or, often enough, cross country.

Using this equipment, a Rigger-Wrecker graduating class at the O.R.T.C., Aberdeen Proving Ground, hung up an unchallenged speed record by recovering an overturned five-ton truck from a deep ditch in three minutes and 28 seconds, under simulated battle conditions.

If your fleet has suffered from lost tonnage due to wartime lack of trucks, Ward LaFrance trucks are the best prescription for quick postwar recovery. Whether your needs call for dump trucks, over-the-road tractors (gasoline or Diesel), or vehicles engineered to your individual needs, Ward LaFrance offers your best profit opportunity: . . . A plan developed particularly for fleet owners makes it possible for you to take full advantage of the rugged power and dependability of Ward LaFrance trucks on a basis which will cut the cost of transportation to the bone.

WARD LAFRANCE

TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC.

ELMIRA, GAI **NEW YORK**

MORE TONNAGE AT THE TIPPLE
BEGINS BACK AT THE BLAST HOLE

To meet mounting demand with less manpower, you must get *more footage per shift.*

The first step: faster, more efficient drilling. COALMASTER Drilling Tools save time six ways:

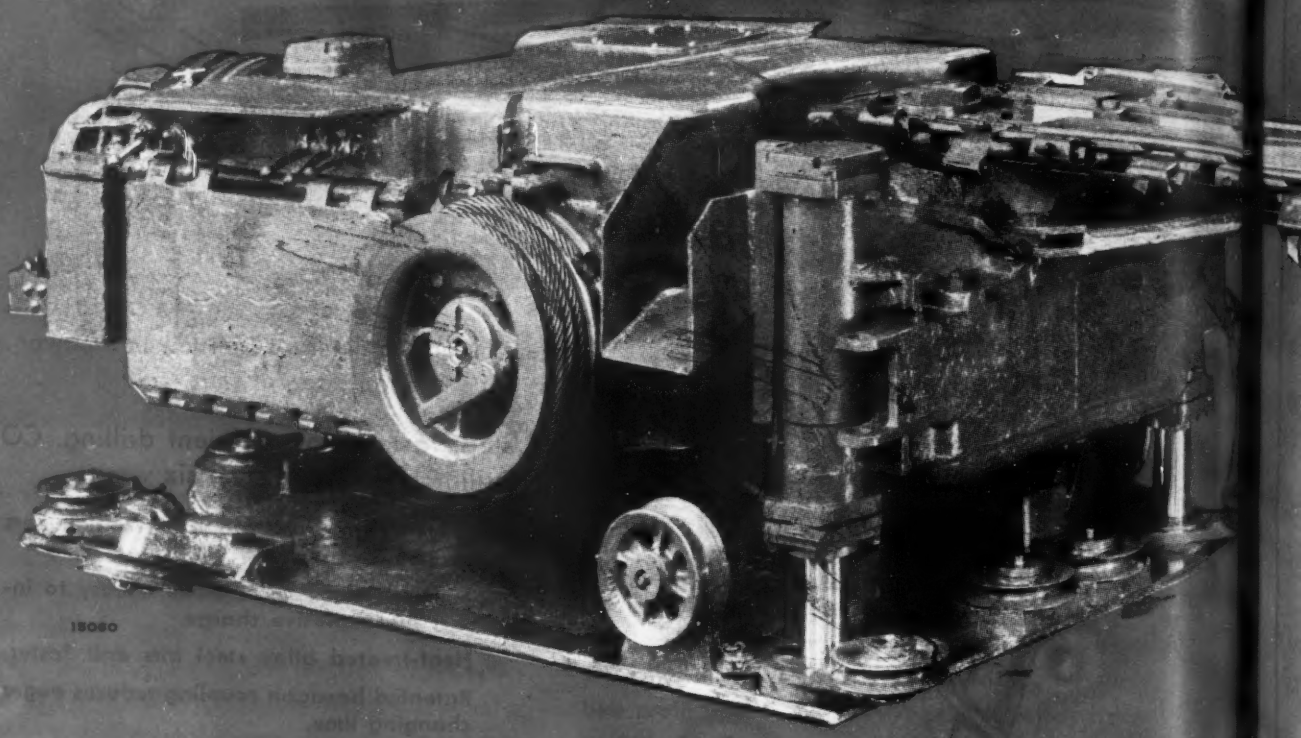
- **Special light-weight Spir-L-Weld augers require less power.**
- **Straight, clean holes make it easy to insert the explosive charge.**
- **Heat-treated alloy steel bits drill faster.**
- **Patented hexagon coupling reduces auger changing time.**
- **Safety sockets prevent injuries.**
- **Less driller fatigue—less time loss.**

Write for Table of Selection of COALMASTER "matched set" equipment to step up drilling efficiency—decrease costs—increase tonnage.

DRILLING COALMASTER TOOLS

CENTRAL MINE EQUIPMENT CO.
ST. LOUIS 8, MO.

The GOODMAN *712*



A Goodman sales engineer will be glad to give you complete details.

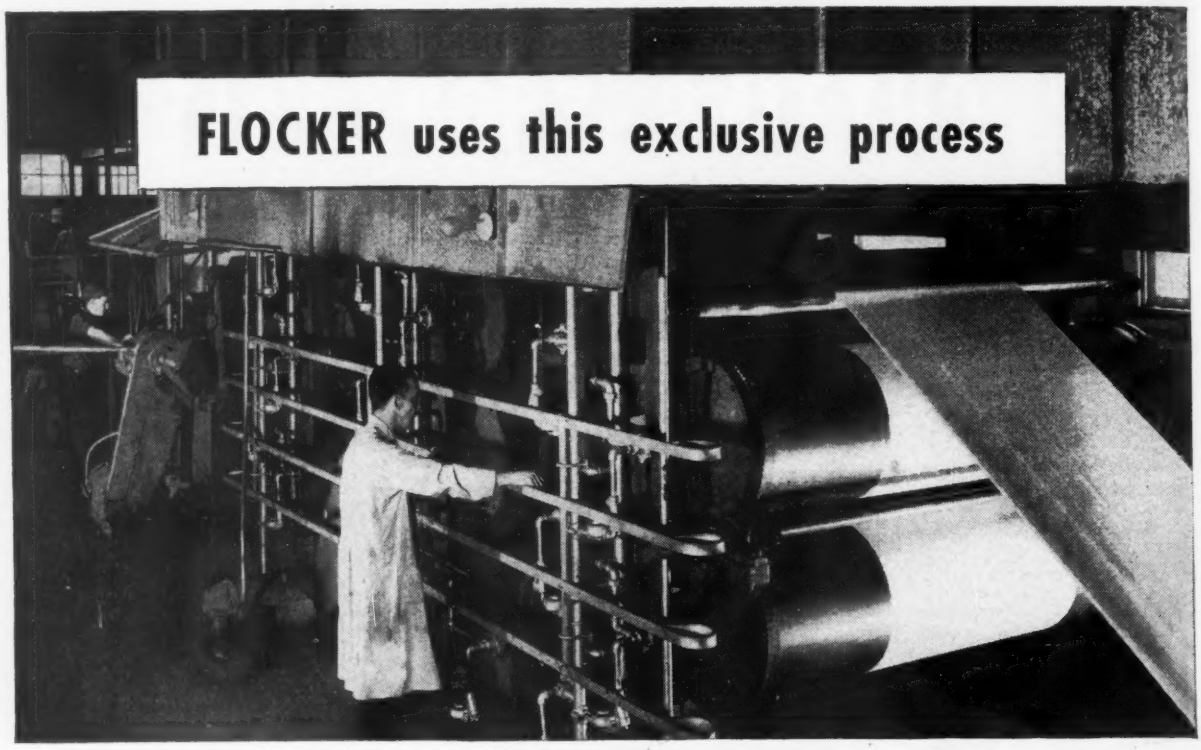
GOODMAN MANUFACTURING COMPANY

TOP CUTTING SHORTWALL

Full Hydraulic Control

- Adjustable height — endwise and sidewise tilt
- High and low speed on each drum
- Positive, quick action — machine responds instantly to flip of control valves

HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS



. . . to give you *better brattice cloth*

Flocker Moropa Brattice Cloth offers greater resistance to fire and mildew . . . stays clean longer and, under identical conditions, outwears the ordinary product.

This all-around superiority is achieved through an exclusive chemical process applied to either Jute or Cotton. The fabric is first saturated with special chemicals, then "can-dried"—a process adapted from the textile field—which thoroughly impregnates and bakes fire and mildew resisting properties into every fiber of the material.

And yet, in spite of its superior qualities, Flocker Moropa Jute Brattice Cloth costs you no more than ordinary Brattice Cloth . . . and prices are only slightly higher on Cotton. In reality, substantial savings can be realized on the use of either type.

If you're interested in the advantages this better Brattice Cloth affords, write for detailed information and quotations.

PROVED SUPERIORITY IN COTTON OR JUTE!

SUPERIOR FIRE-RESISTANCE—Protection lasts almost indefinitely, since chemicals are so thoroughly impregnated that they do not readily leach out.

SUPERIOR MILDEW REPELLENCE—Chemicals used do not absorb excessive moisture and fabric remains relatively dry and repellent to mildew.

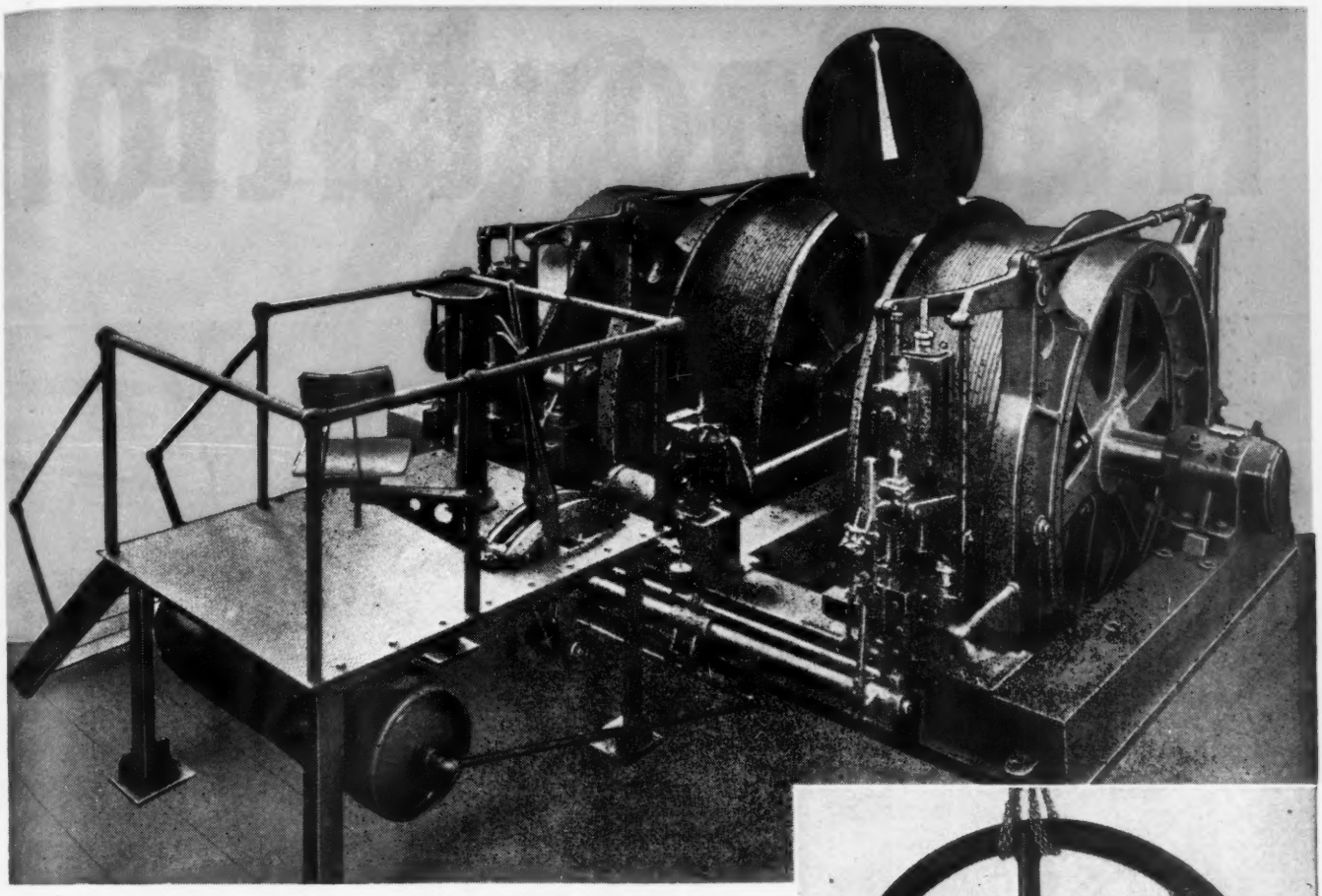
STAYS CLEAN—Does not collect mildew "whiskers"—hence no slimy dirt.

LONGER SERVICE—Can be used and re-used over and over again. Absence of slime eliminates objections to recovery—men will co-operate in maintaining this Brattice Cloth which so vastly improves their working conditions.

JOHN FLOCKER AND COMPANY

644 GRANT STREET, PITTSBURGH 30, PA.

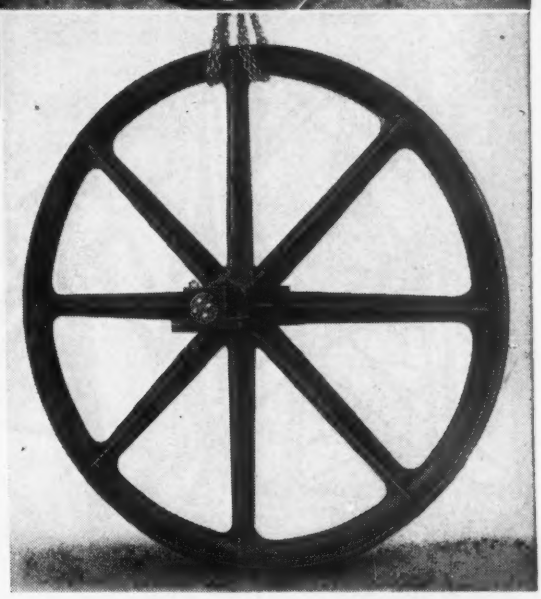
Since 1822, Ropes, Slings, Nets and Cordage Fittings, Tackles, Waxed and Unwaxed Linen . . . Specialists in Cordage Problems . . . Wire Rope



For Service Overseas

In allied countries, as at home, Vulcan equipment is helping, importantly, to maintain production of coal and many other essential materials. The hoist illustrated above, for example, will soon be giving safe dependable service at a Russian colliery—where its simple rugged design, with automatic protection against over-winding, over-speeding and power-failure, will permit efficient operation by the sturdy women who are filling men's places until the war is won.

Write us regarding any heavy-duty hoisting requirement. Hundreds of successful installations, throughout the United States and many other countries, often enable Vulcan engineers to make helpful suggestions—without charge or obligation.



VULCAN "ALLCASTEEL" SHEAVES were specified and furnished for this, and other, Russian installations. The sheave shown above (for Russia) is ten feet pitch diameter; grooved for 1-3/8" rope and equipped with anti-friction bearings. Light, strong, and highly resistant to rope wear, Vulcan "Allcasteel" Sheaves have proved their superiority for every type of heavy-duty service. Available in any size—for horizontal or vertical mounting—with either plain or anti-friction bearings.

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Established 1849

Main Office and Works **WILKES-BARRE, PA.,** New York Office 50 Church

Heavy-Duty Electric Hoists
Self-Contained Hoists
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geared and electric drive

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Ball, Rod and Tube Mills

Transportation

TEXACO

REG. T.M.

TEXACO LUBRICANTS

...a *Major* Factor

COAL in the ground is only potential energy. To get it out and put it to work producing heat and power calls for *good transportation.*

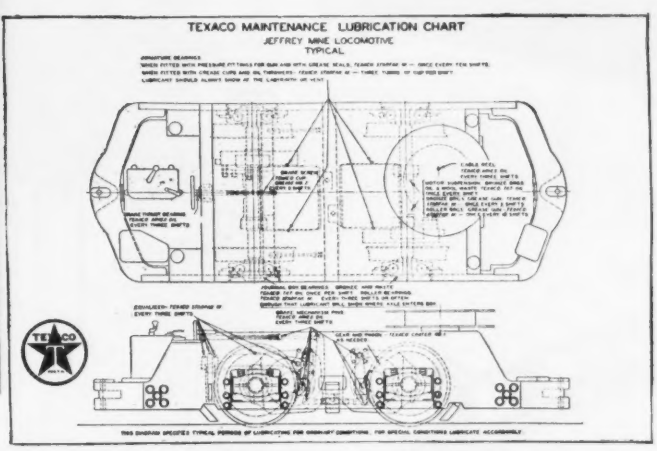
Peak performance of mine transportation equipment is therefore essential . . . and a major factor in assuring this is effective lubrication. That is why so many operators everywhere use Texaco.

Texaco Starfak, for instance, is widely used in grease-lubricated ball and roller bearings of electric locomotives, cutters, loaders, shuttle cars, etc. *Starfak* provides effective lubrication over a wide range of temperature conditions and, by offering high resistance to separation, leakage and oxidation, helps greatly to increase bearing life.

Texaco lubricants for all types of underground coal mining machinery are approved by leading manufacturers who have cooperated with us in preparing Texaco Maintenance Lubrication Charts . . . available on request.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States.

The Texas Company, *National Sales Division, Dept. C,* 135 East 42nd Street, New York 17, N. Y.



FREE! Texaco Maintenance Lubrication Charts show clearly not only *where* to use Texaco, but *when* and *with what* lubricant to service each lubrication point with products approved by manufacturers of all leading makes of cutters, loaders, locomotives, etc. Order the charts you need by make and model.

For the Coal Mining Industry

To help you judge

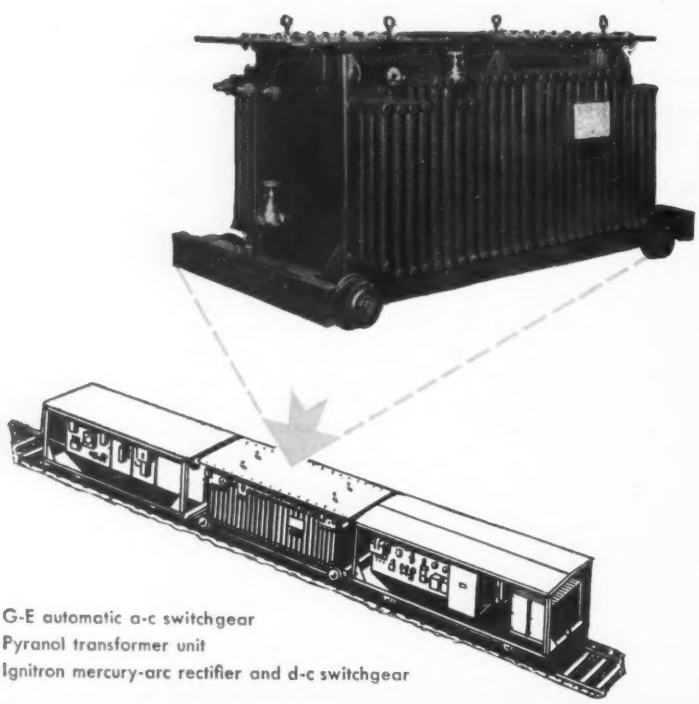
WE SUGGEST 6 QUESTIONS FOR MINING MEN TO ASK

Underground installation of electric equipment calls for careful analysis of many requirements. When it comes to transformers, for example, you want to know about safety, fire hazard, and the various factors which determine reliability and long-range economy. To aid your choice of transformers for mine service, G.E. offers the check questions on the opposite page.

General Electric, the largest manufacturer of transformers of all types, recommends Pyranol* units for underground service. The reasons, given on the opposite page, are based on twelve years of experience in building more than four million kva of this type.

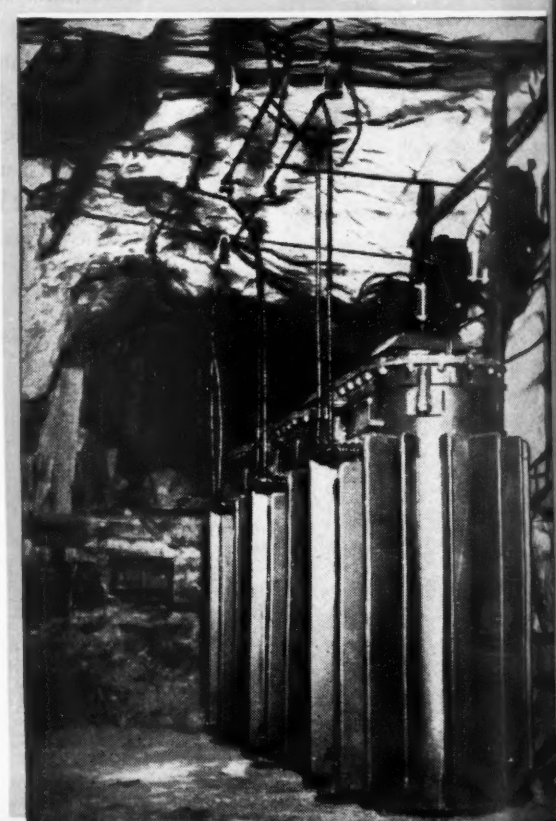
G-E engineers will gladly assist you with more detailed data on transformer application as well as on other phases of mine electrification—locomotives, motors, switchgear, rectifiers, and the rest. Call on them via the G-E office in your area. *General Electric Co., Schenectady 5, N. Y.*

*Trade-mark Reg. U.S. Pat. Off.



G-E automatic a-c switchgear
Pyranol transformer unit
Ignitron mercury-arc rectifier and d-c switchgear

G-E portable underground substations make it practical to convert to direct current thousands of feet closer to the working face thus avoiding both large voltage drop and excessive copper (in low-voltage d-c feeders)



Installed underground, these G-E transformers are filled with noninflammable, nonsludging, chemically stable Pyranol

TRANSFORMER FITNESS

HOW LONG WILL IT LAST?

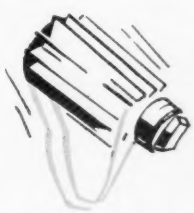
Pyranol transformers have the lowest failure record of all major electric apparatus. There is ample evidence that they stand up in mining service. Why? Because their windings are protected from dirts and moisture by immersion in a stable liquid of high dielectric strength.

WHAT IS THE FIRE HAZARD?

Even if internal arcing should occur in a Pyranol transformer, no fire will develop because "you can't burn Pyranol." No Pyranol transformer has ever burned or contributed to a fire—a record that justifies selection of Pyranol transformers for underground installation.

SUPPOSE IT DOES SHORT?

If a short circuit causes a heavy, sustained arc under Pyranol—i.e., if all usual means of breaking the circuit fail—gas forms, and escapes through a relief diaphragm, and is readily disposed of. This gas is easily detected, and there is no hazard of fire, smoke, or deadly carbon monoxide.



WHAT ABOUT FLEXIBILITY?

The Pyranol transformer is equally suited for your outdoor installations — in rain or snow, or dust-laden wind. In Pyranol units, you get a degree of flexibility unobtainable with any other type of transformer.

WHAT SURGE VOLTAGE CAN IT STAND?

Underground transformers supplied from overhead lines may be subject to lightning surges. The high insulation strength of Pyranol permits adequate protection against damage by use of economical commercial arresters.

AND WHAT ABOUT MAINTENANCE?

Sealed against entrance of moisture and dirt, G-E Pyranol transformers require little maintenance. There's no sludging. The sturdy steel tank provides extra protection from physical damage.

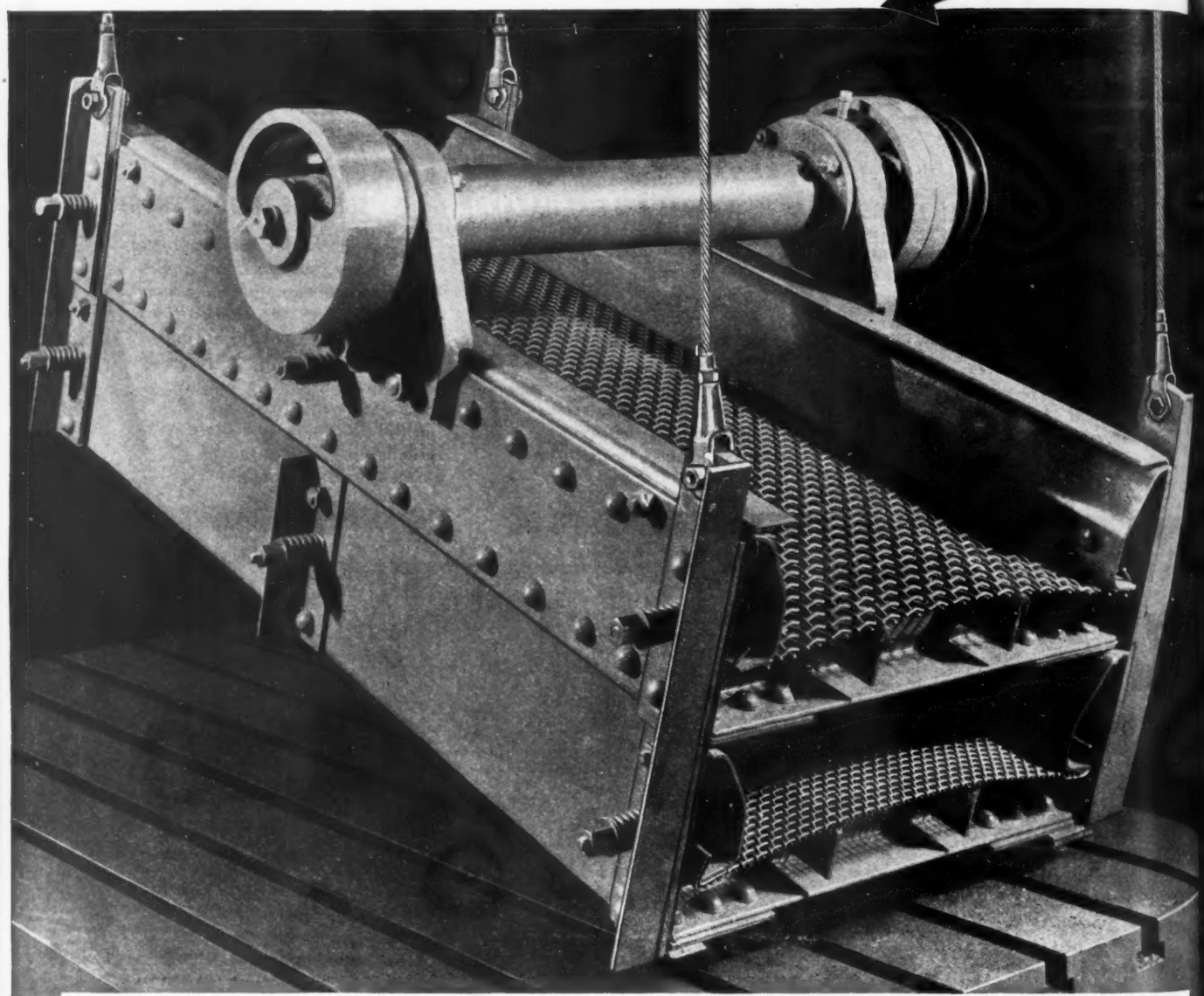
Buy all the BONDS you can—and keep all you buy

667-38-148

GENERAL ELECTRIC

PYRANOL TRANSFORMERS

You Buy This...



THE AERO-VIBE Vibrating Screen — available in 1 x 3 to 5 x 10-foot, single and double deck sizes — is used in coal tipples and screening plants for degradation screening, preparation of stoker coal and re-screening domestic coal. Maximum screen openings to 1½".

Aero-Vibe is designed for low power consumption — up to 3 x 6-ft sizes require only 1 hp motor to operate; up to 3 x 8-ft, 2 hp; up to 5 x 10-ft, 5 hp. Readily accessible mechanism (mounted above screen body), and simplified design assure low maintenance.

Vibratory motion is produced by off-center weights (one fixed, and one adjustable on each side). The outer weights are adjustable to increase or decrease intensity of vibration. Send for Bulletin B6099. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

WE WORK FOR VICTORY — WE PLAN FOR PEACE

BASIC EQUIPMENT FOR COAL INDUSTRIES:

ALLIS-

Vibrating Screens, all types for Wet or Dry Separation

Electric Motors, Control, Texrope V-Belt Drives

..You Get This!

1 COOPERATIVE ENGINEERING

Allis-Chalmers engineers, specializing in coal industry requirements, work hand-in-hand with your own staff or *tipple manufacturer* — look for ways to make *existing* as well as new equipment "team up" to give you greater output at lowest cost.

2 PRODUCTION ANALYSIS

There's no guesswork when you specify Allis-Chalmers equipment. Experienced field engineers make their selection of machinery for your mine, tipple, preparation plant or dock on the basis of how it will fit in your *entire* production process.

3 UNBIASED RECOMMENDATION

A-C builds many types, styles and sizes of equipment for coal industries. When you need a screen, for example, selection can be made from *four* different types. Recommendation is unbiased — because we supply *exact* equipment you need.

4 EMERGENCY PARTS SERVICE

There's no "sell-and-forget" attitude at A-C. With district offices conveniently located in your area, you are assured of *emergency expediting* when replacements or repairs are needed. In most cases, parts are shipped immediately from stock.

CHALMERS

Full line of Single & Multi-Stage Centrifugal Pumps

Mine Hoists—with automatic "Regulex" control

Crawler & Wheel-type Tractors, Allied Equipment

Circuit Breakers, Unit-Substations, Rectifiers

A 1742

3 Things A Shortwall Should Have:

POWER · EFFICIENCY · E

The Sullivan 7-B Shortwall Has Them All!

A good shortwall coal cutter must have power to keep ahead of the loader or conveyor; it must operate efficiently, even in close quarters; and it must be easy to operate, to maintain production at peak level.

Check the Sullivan 7-B Shortwall and you'll find it meets all three of these requirements:

1 POWER—A 50 h.p. slow speed motor and a cutter bar up to 9 feet long form a combination that will meet any cutting conditions.

2 EFFICIENCY—The 7-B is only 25 inches high and is less than 6 feet long, ideal for efficient close work. The tapered front end makes possible a full sump cut and a straight rib.

3 EASE OF HANDLING—Fewer controls, and these located at the rear of the machine, permit faster, safer operation. The easy-to-handle 7-B will get more work done at a lower cost because operators like to work with this modern shortwall.

There are additional features on the 7-B that will interest you. "Drop-out" type cutter-chain-clutch, drum-retarding friction controls and stationary rope sheaves conveniently located in the open . . . are some of these features. Your nearest Sullivan branch office will send Bulletin C-30 to you on request. Get your copy and learn how the Sullivan 7-B Shortwall can help you with your coal cutting problems. Sullivan Machinery Company, Michigan City, Indiana. IN CANADA: Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario.

OFFICES—Birmingham • Butte • Chicago • Dallas • Denver • El Paso • Huntington • Knoxville • Middlesboro • New York • Pittsburgh • Salt Lake City • San Francisco • Scranton • Seattle • St. Louis • Johannesburg • Sydney • Grantham.

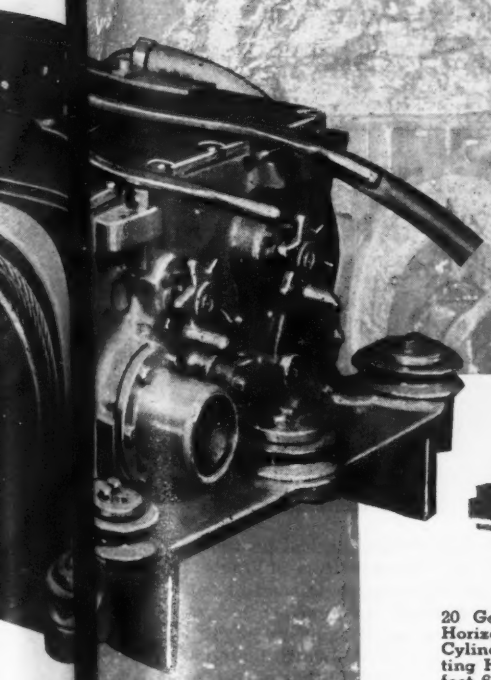
PRODUCTS—Coal Mining Machines • Scraper Haulers • Rock Loaders • Hoists • Car Pullers • Air Compressors • Coal Drills • Rock Drills • Cutter Bit Sharpeners and Heaters • Core Drills and Contract Core Drilling.

SULLIVAN

Factories at Claremont, N. H., and Michigan City, Ind.

Further details on any of the three Sullivan coal cutters on request!

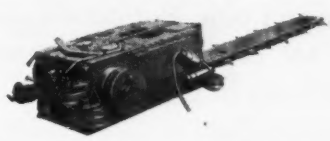
EASE OF HANDLING



7-AU

7-AU Universal Track Cutter is simply constructed—Only 20 Gears and 6 Hydraulic Valve-Levers. Horizontal Cutting Range with Hydraulic Cylinder Type Roll, 41 feet and 1 inch. Cutting Height from 10 inches below rail to 8 feet 6 inches above. Shears Parallel Cuts 21 feet 8 inches apart.

11-B



11-B Conveyor-Type Shortwall Cutter—Only 21 inches high, cuts a six-inch kerf yet delivers cuttings to the rear. Splash lubrication. Anti-friction bearings, alloy steel gears and pinions. Big-load-starting motor. 58 inches long, 20, 35, or 50 h.p.

SULLIVAN 7-AU IS LICENSED UNDER PATENTS TO E. C. MORGAN, PATENTS NUMBERS 1704837, 1760944, 1797132, 1953329, 1958926.

WALWORTH PIPE WRENCHES

THE WALCO PIPE WRENCH

Made to Federal Specifications GGG-W-651a

For Type II Heavy Duty Adjustable Pipe Wrenches

The world's strongest pipe wrench. Equipped with renewable lower jaw. Has only six parts—all forged steel. Sizes 6" to 48".

THE WALWORTH GENUINE STILLSON

Made to Federal Specifications GGG-W-651a

For Type I Normal Duty Adjustable Pipe Wrenches

Known throughout the world as the handiest tool in the pipe fitter's kit. Sizes 6" to 48".

THE WALWORTH PARMELEE

Made to Federal Specifications GGG-W-651a

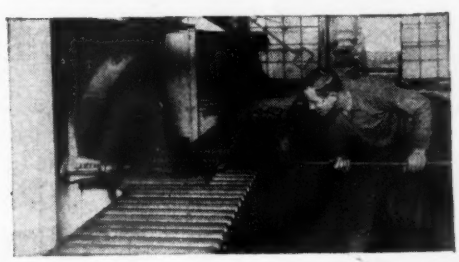
For Type IV Girth Pipe Wrenches

No teeth – grips like a human hand. Won't scratch or mar brass pipe. Particularly useful in making up coils. Made in 4 sizes for 3/8" to 4" I.P.S. Girths in special O.D. sizes available.

These three types of pipe wrenches are manufactured by the Walworth Company, and are noted for their safety, strength, and simplicity of operation.

Walworth, with more than a century of "know-how," also manufactures a complete line of valves, fittings, and pipe. For details see your Walworth distributor, or write on your company letterhead for free copy of Catalog 42.

METALLURGICALLY MODERNIZED



The most advanced metallurgical procedures are employed in the manufacture of Walworth Pipe Wrenches. Forging, heat-treating, and machining operations are performed with modern production equipment under strict supervision. In this way Walworth maintains the high standards of quality that have made Walworth pipe wrenches famous throughout the world.

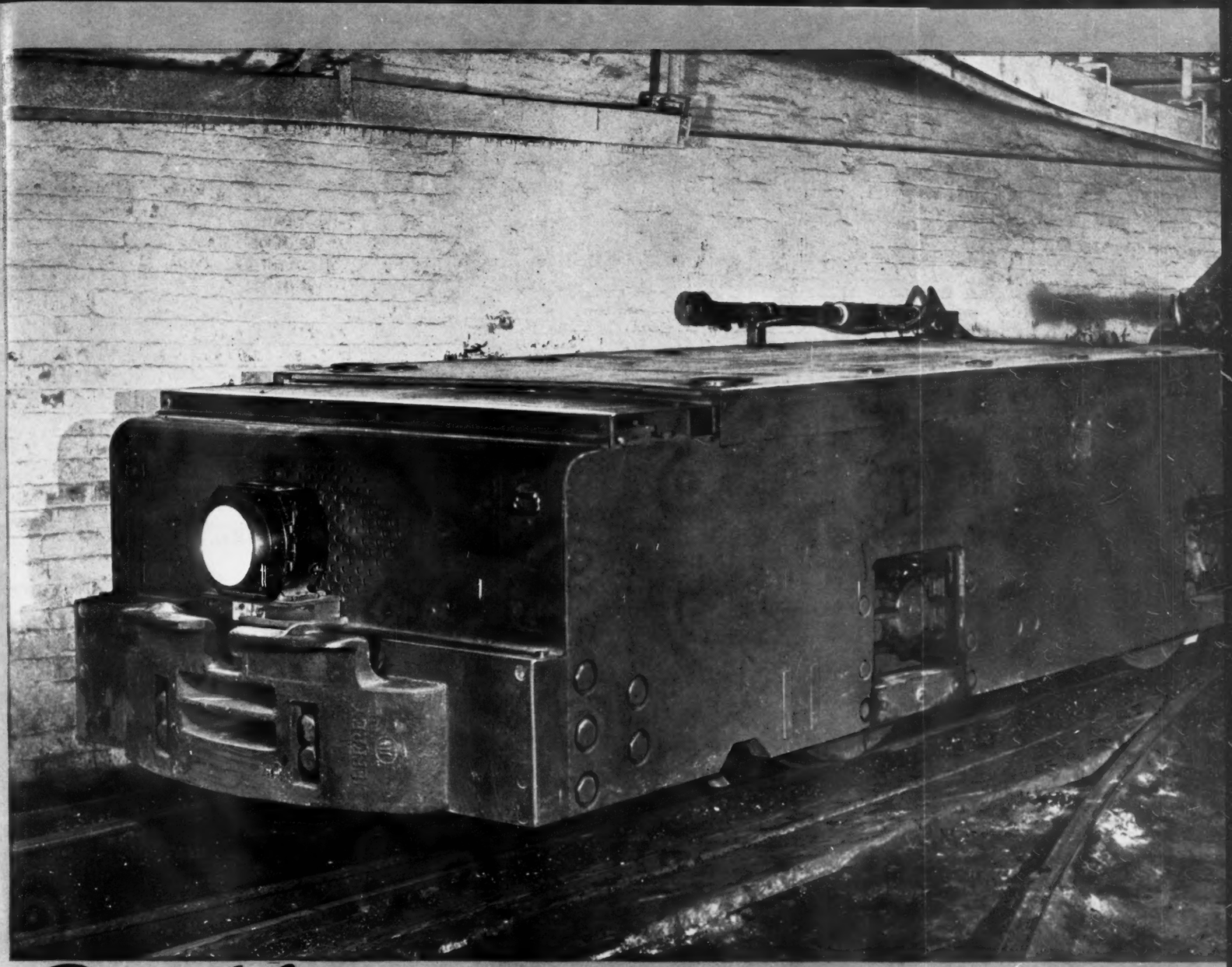
WALWORTH

valves AND fittings

BOSTON WORKS
KEWANEE WORKS

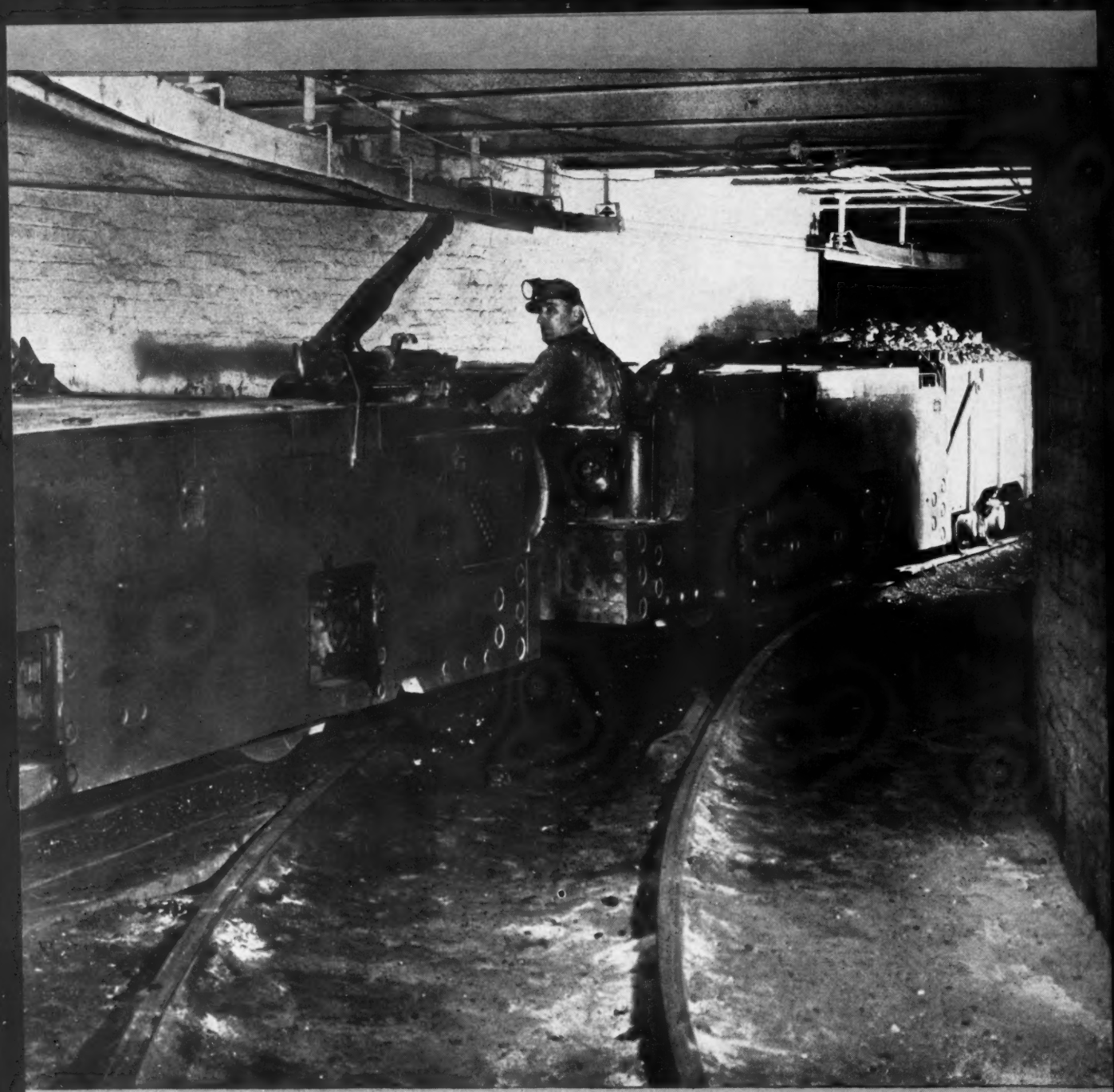
60 EAST 42nd ST., NEW YORK 17, N.Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



Jeffrey LOCOMOT

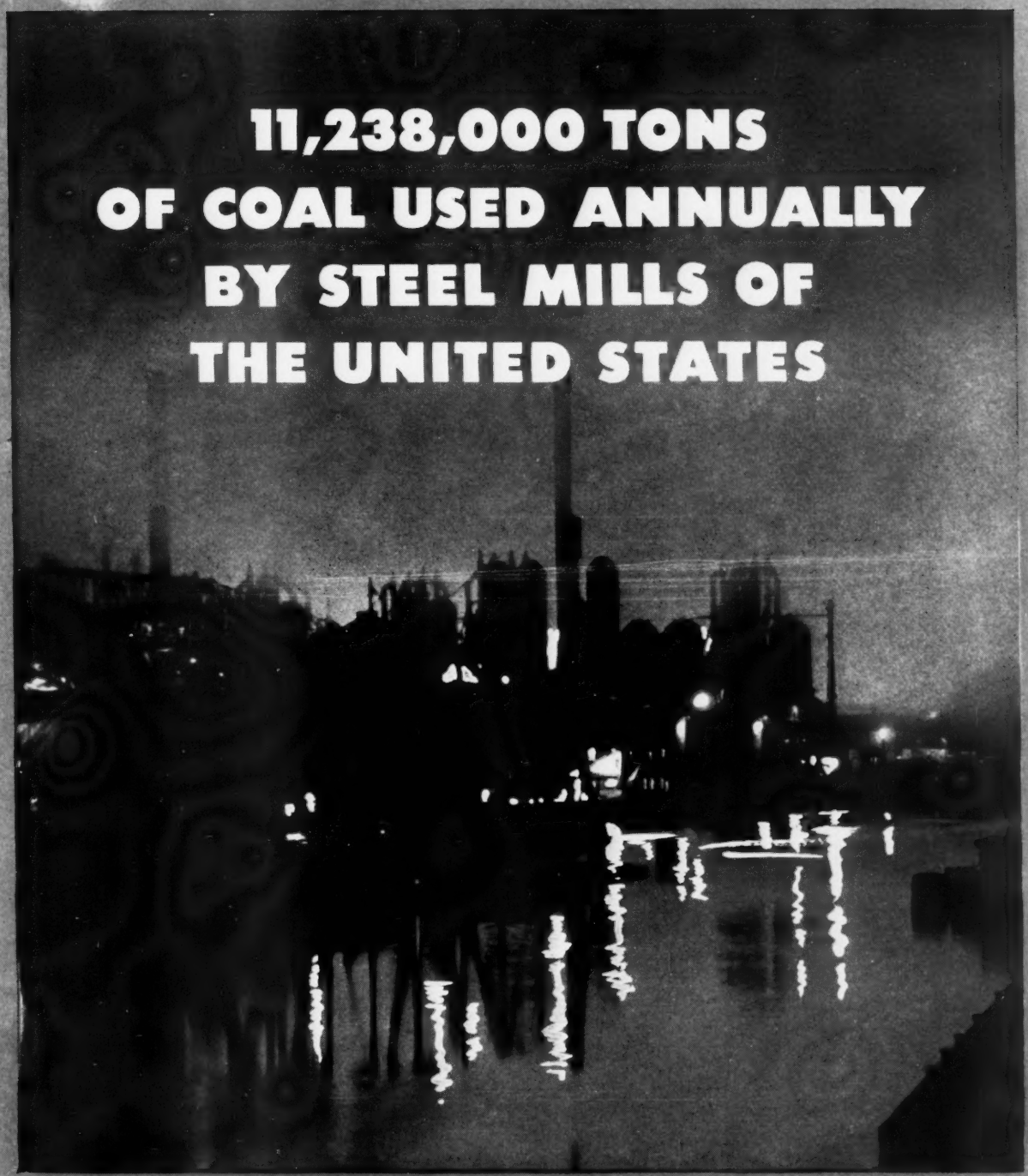
Shown above is a typical installation of a Jeffrey haulage type locomo
Locomotives like these, teamed up with equally dependable Jeffrey G
transporting coal from face to preparation plant in a host of mines sup



MOTIVES

effrey haulage type locomotive in mine service. Heavy duty, rugged Jeffrey ually dependable Jeffrey Gathering Locomotives, are doing a major job of plant in a host of mines supplying coal to steel mills throughout the nation.

11,238,000 TONS OF COAL USED ANNUALLY BY STEEL MILLS OF THE UNITED STATES



The Steel Mills of the United States consume this enormous coal tonnage annually to maintain adequate steel production for the war effort. Modern Jeffrey Coal Mine Equipment . . . Cutters, Loaders, Conveyors, Locomotives, Drills, etc. . . . play an important part in producing coal to meet the steel industry's need.

NS
NUALLY
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Conveyors,
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itry's need.

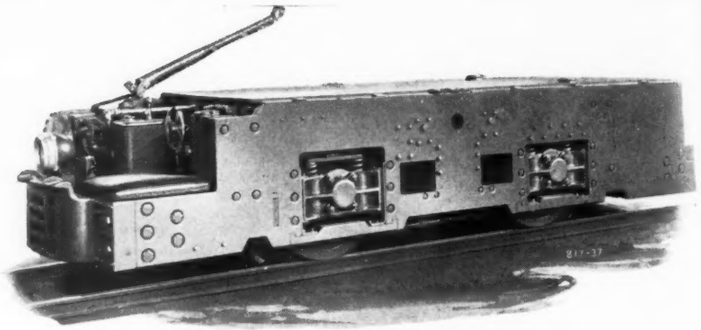
Jeffrey LOCOMOTIVES
FOR ALL TYPES OF SERVICE

JEFFREY SERVICE TO THE COAL MINES MEANS SERVICE TO ALL INDUSTRY

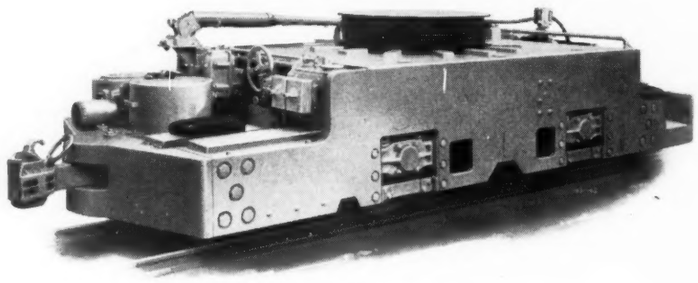
~

OTHER JEFFREY EQUIPMENT FOR COAL MINES

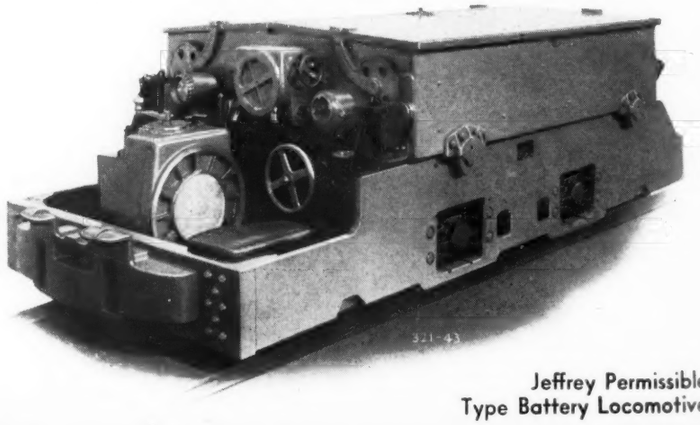
- BLOWERS
- CONVEYORS
- CRUSHERS
- CUTTERS
- DRILLS
- FANS
- JIGS
- LOADERS
- SCREENS



Jeffrey Trolley Type Haulage Locomotive



Jeffrey 8-ton Explosion Tested Gathering Locomotive



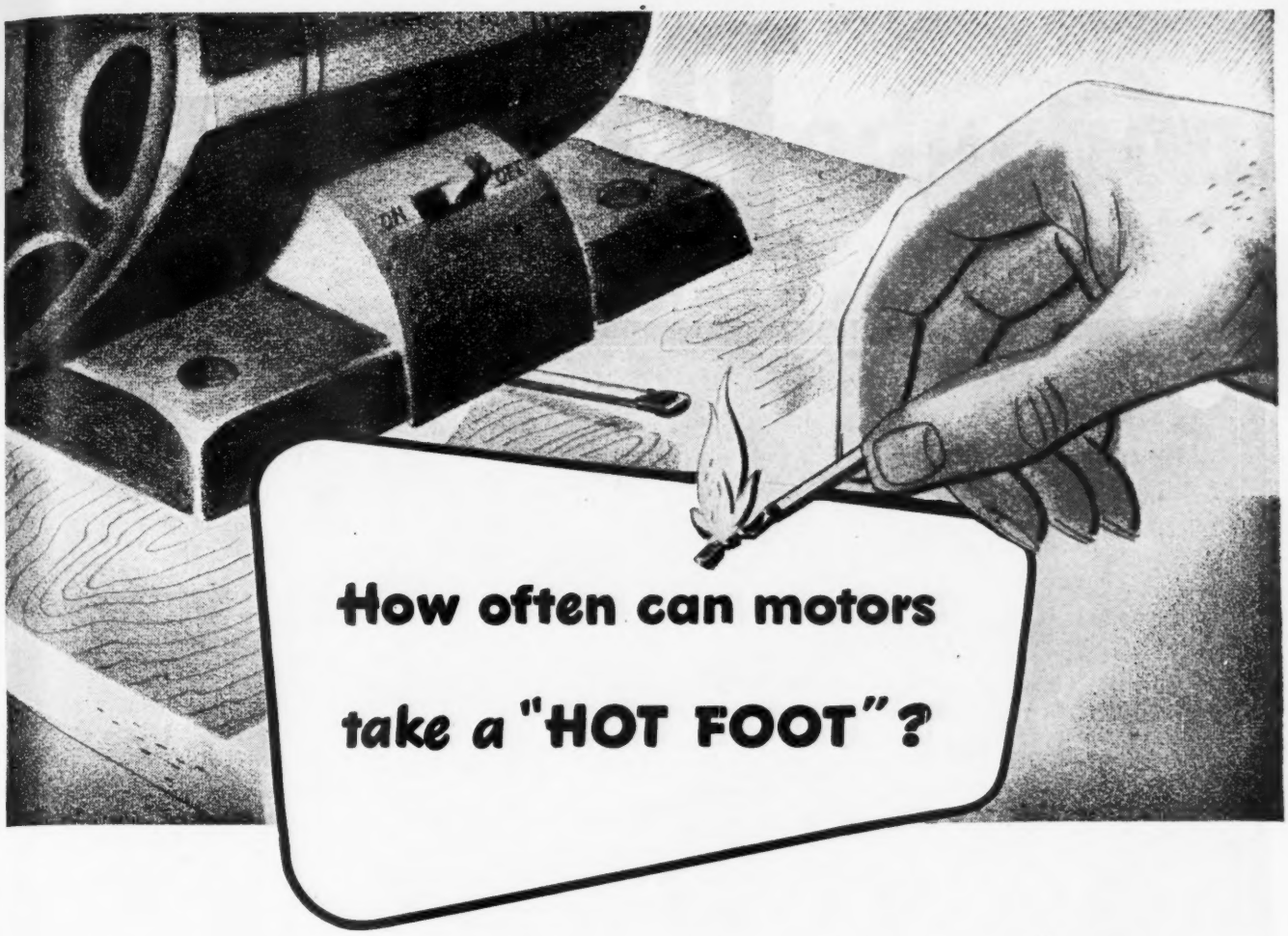
Jeffrey Permissible Type Battery Locomotive

THE JEFFREY MANUFACTURING COMPANY

Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices:	Baltimore Birmingham Boston Buffalo	Chicago Cleveland Cincinnati Detroit	Denver Harlan Houston Huntington	Milwaukee New York Philadelphia Pittsburgh	Scranton St. Louis Salt Lake Cit
Service Stations:	Pittsburgh Harlan, Ky.	Birmingham St. Louis	Logan-Beckley W. Va.		Scranton
Foreign Plants:	Jeffrey Mfg. Co., Ltd. Montreal, Quebec	British Jeffrey-Diamond, Ltd. Wakefield, England		Jeffrey-Galion (Pty), Ltd Johannesburg, S. A.	



Overloads, dirt, corrosive acids, heat, moisture *and the human element* can all play tricks on even the best designed motors. Any one, or a combination of them, can give your motor a "hot foot" once too often, then — failure.

Most motors are designed, by experts, to do their specific jobs efficiently. Most of them are built to give trouble-free service and to operate economically. Without the motor manufacturers' design and production skill American industry would be at a standstill today. Yet, the records show that motor failure still imposes an extremely heavy time and dollar loss on every industry.

Fiberglas* Electrical Insulation Materials have proved their ability to protect motors of all types from the conditions which cause a majority of the failures. They provide that "extra" protection which assures longer, more economical operation and decreases down time and its consequent production losses.

Fiberglas Insulation cuts rewind shutdowns

Typical of the advantages which Fiberglas Insulation provides is this experience of a concern in the metal-working industry.

A manufacturer of automotive parts was using 3 h-p, squirrel-cage, 3600 rpm motors to drive fans for operator and hot stock cooling. The motors were operated in high ambient temperatures and exposed to dust, grit and metal scale. The motors were failing at sixty-day intervals. Operators complained and the production line was slowed down while motors were being replaced and rewound.

Then these motors were rewound with the same size and type of wire, but with Fiberglas Insulation throughout. They have been in operation for over a year, with no failures to date.

And remember, the only added cost in rewinding with Fiberglas is the slight difference in the cost of the insulating materials.

Fiberglas Electrical Insulation Materials, in plain and treated forms, are available now. For complete information consult your distributor or write for new catalog. *Owens-Corning Fiberglas Corporation, 1862 Nicholas Bldg., Toledo 1, Ohio. In Canada, Fiberglas Canada Ltd., Oshawa, Ontario.*

* * *

BE SURE TO SEE THE FIBERGLAS ELECTRICAL INSULATION MATERIAL EXHIBIT

THE NEXT SHOWINGS ARE: Bellevue Stratford, Philadelphia, January 30-February 2; Belvedere, Baltimore, February 7-8; Hotel Roosevelt, Pittsburgh, February 19-21; Hotel Statler, Buffalo, February 27-March 1; Biltmore, Dayton, March 7-8; Netherlands Plaza, Cincinnati, March 13-15. Further showings will be announced later.

ASK FOR FIBERGLAS—IN YOUR NEXT NEW MOTOR—AND ON YOUR NEXT REWIND

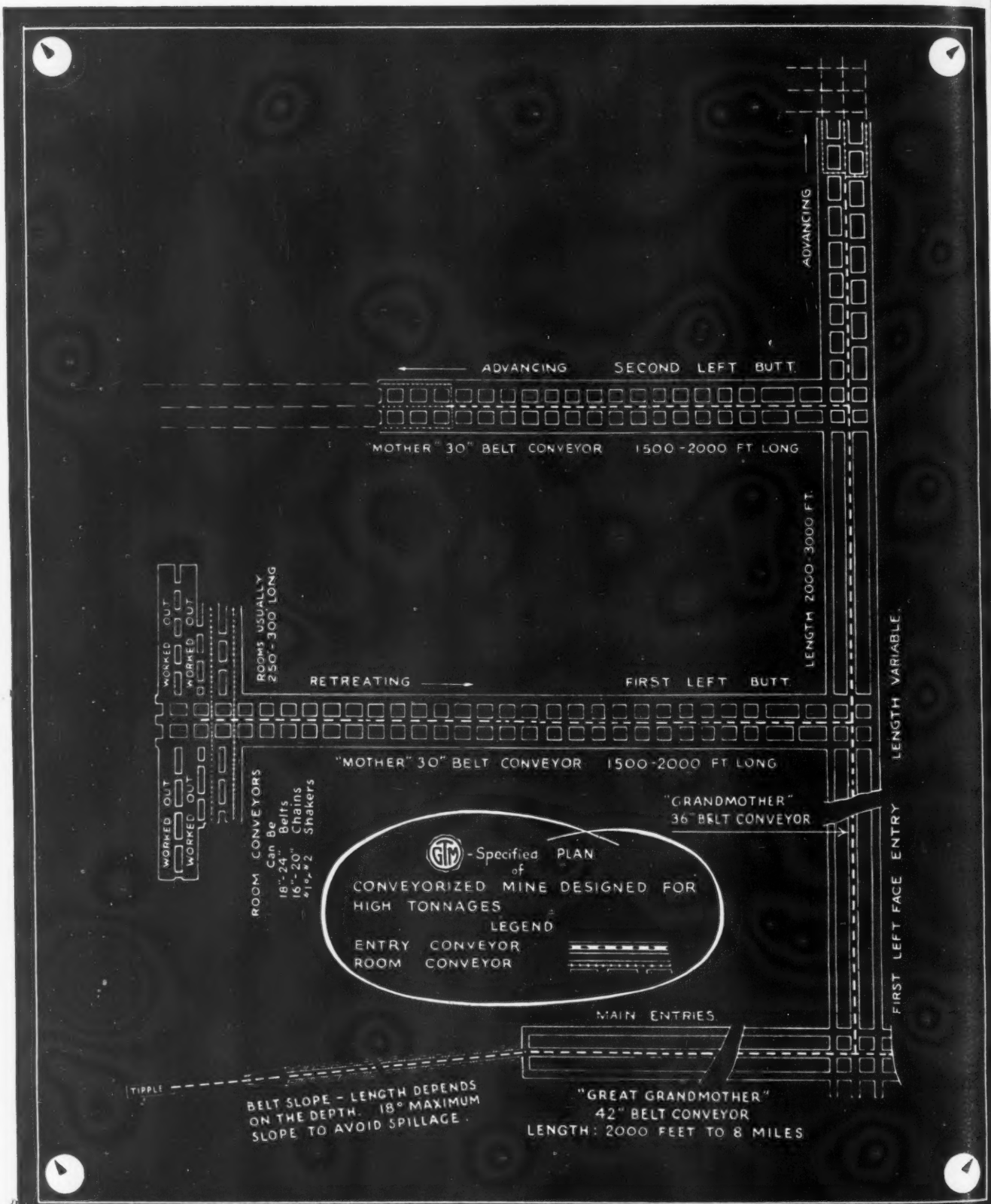
FIBERGLAS *ELECTRICAL INSULATION*

*T. M. Reg. U. S. Pat. Off.

THERE'S A COMPLETE LINE OF FIBERGLAS ELECTRICAL INSULATIONS

YARNS • TAPES • CORD • SLEEVING • CLOTH AND OTHER FORMS. Also available in: Magnet wire, Lead wire, Special wires, Varnished cloth and tape; Mica Combinations: Laminates, Saturated sleeving, Varnished tubing, Pressure sensitive tapes, Special products.

BLUEPRINT fo


ADVANCING
ADVANCING
SECOND LEFT BUTT
"MOTHER" 30" BELT CONVEYOR 1500-2000 FT LONG
LENGTH 2000-3000 FT.
ROOMS USUALLY 250'-300' LONG
WORKED OUT
WORKED OUT
WORKED OUT
WORKED OUT
RETREATING
FIRST LEFT BUTT
LENGTH VARIABLE
"MOTHER" 30" BELT CONVEYOR 1500-2000 FT LONG
"GRANDMOTHER" 36" BELT CONVEYOR
ROOM CONVEYORS Can Be 18"-24" Belts 16"-20" Chains 1 or 2 Shakers
GTM - Specified PLAN of CONVEYORIZED MINE DESIGNED FOR HIGH TONNAGES
LEGEND
ENTRY CONVEYOR
ROOM CONVEYOR
FIRST LEFT FACE ENTRY
MAIN ENTRIES
TIPPLE
BELT SLOPE - LENGTH DEPENDS ON THE DEPTH. 18° MAXIMUM SLOPE TO AVOID SPILLAGE.
"GREAT GRANDMOTHER" 42" BELT CONVEYOR
LENGTH: 2000 FEET TO 8 MILES

for lower cost production

with GOODYEAR "COAL-FLO" Belts

IN the blueprint at the left you see a basic plan for achieving minimum production cost per ton in any high output mine. Developed by the G.T.M. (Goodyear Technical Man) out of his experience in modernizing hundreds of mines, it calls for complete conveyorization from rooms to tipple — employing Goodyear "Coal-Flo" belts.

Goodyear "Coal-Flo" belts cut the cost of conveyorization because they last longer — reduce replacement expense to a minimum. Out of *many hundred thousand feet* of Goodyear belting in use below ground, more than 95% is still working after 6-8 years' service.

There are SIX exclusive reasons why Goodyear "Coal-Flo" belts give this longer service:

1. PROPER TROUGHING INDICES
2. ACID-NEUTRALIZING COMPOUNDS
3. MILDEW-INHIBITED CARCASS
4. GREATEST COVER ADHESION
5. HIGHEST FLEX LIFE
6. MAXIMUM BRUISE RESISTANCE

GET THE COMPLETE STORY

Every one of these factors is so important, you owe it to yourself to get complete data on each, before mechanizing or replacing your present belt equipment. The G.T.M. is prepared to show you how Goodyear belts excel in each respect, both engineering-wise and in case history mine records. To bring him to your office, write Goodyear, Akron 16, Ohio or Los Angeles 54, California — or phone the nearest Goodyear Industrial Rubber Products Distributor.

"Coal-Flo"—T.M. The Goodyear Tire & Rubber Company.

GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR CONVEYOR BELTS THAN ON ANY OTHER KIND

COPPER
A
B
C
AUTOMATIC APC LAM

. . IS BASIC

From (1500x) microscopy to pilot-plant testing, Research here seeks constant product betterment

In the General Cable Research Laboratory at Bayonne one soon becomes conscious that this unit is not just a laboratory but an institution on which the technical advance of an industry largely depends. At what speed rate can continuous annealing of copper be accomplished? How control materials for more perfect surface finish? What refinement of raw material and process specifications for specific use-applications? General Cable scientists delve deeply that the end product may be still more serviceable, of still greater uniformity, and of no greater cost.

A Grain structure of annealed hard drawn wire—X1500

B Grain refinement of Hot Rolled Rod—X200

C Elongation of grains in longitudinal section of wire—X1500

GENERAL CABLE CORPORATION

Manufacturers of Bare and Insulated Wires and Cables for Every Electrical Purpose

ANOTHER REASON WHY Bethlehem Form-Set LASTS

Let's say that after a long period of service there's a broken wire in your Bethlehem Form-Set (preformed) rope. What happens? Well, the answer is . . . very little happens. Even though the wire has broken clear through, it still lies flat in its original position. It doesn't spring up; it doesn't pop loose from the strand. That's because the rope has been preformed . . . relieved of the tension that makes wires try to straighten out.

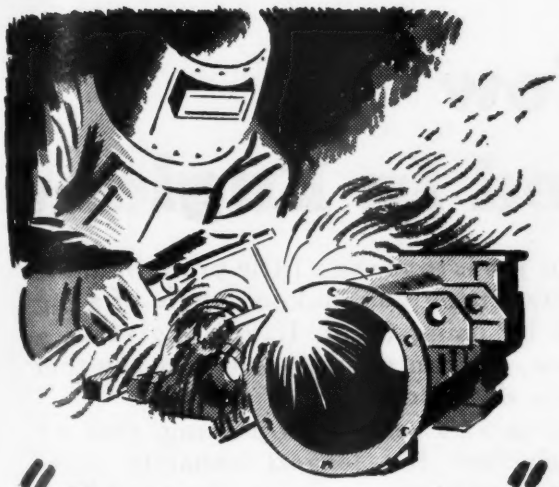
How does this affect the remaining life of your rope? It affects it very vitally. Since the wire still lies smoothly in place, the broken ends do not lap over the other wires. Thus no lump is formed; the broken wire does not crush, grind, or dig into its neighbors as the rope travels rapidly on sheaves and drums.

When an outer wire breaks in a rope of 6 x 19 construction, the total strength is reduced about six-tenths of one per cent. This in itself is not serious. But the strength is reduced another six-tenths of one per cent for each additional broken wire. That's why it's so important to avoid the nicking effects of overlap—a condition that encourages failure in other wires.

You can eliminate this type of progressive wire breakage by rigging your machines with Bethlehem Form-Set. Moreover, when you use Form-Set, you have a rope that is supple, easy to handle, and highly resistant to bending fatigue. All of these factors mean longer wire-rope life—which, in turn, means overall savings.

When you think WIRE ROPE

. . . think BETHLEHEM



With coal production at its present peak, many over-age motors must be kept on the job. Here's one way coal companies are doing it.

"Worn-out" Locomotive Motors

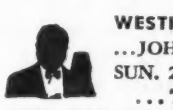
GO BACK GOOD AS NEW

Passing over rail joints day after day gives these motors a severe pounding. Wear is bound to develop in housings, tapped holes and axle bearing parts.

In normal times, badly worn motor frames would be discarded. But not today. A service developed by Westinghouse *Manufacturing and Repair** Plants, conveniently located in your district, is keeping them on the job.*

Worn frames are delivered to Westinghouse M & R Plants. By a special welding process, tapped holes, housings and axle bearing parts are built up, then redrilled and remachined. The frames are returned as good as new, ready for many more years of service.

Many large coal companies use this Westinghouse M & R service . . . another example of the ability of this factory-trained organization to handle electrical repair problems economically and efficiently. J-90518-A



WESTINGHOUSE PRESENTS
. . . JOHN CHARLES THOMAS
SUN. 2:30 EWT., NBC.
. . . TED MALONE
MON. WED. FRI. 10:15 EWT., BLUE NET.

When vital electrical equipment needs repair . . . phone the nearest office of Westinghouse Electric and Manufacturing Company for

Westinghouse

COMPLETE REPAIR SERVICE

*33 M & R PLANTS • • ONE NEAR YOU

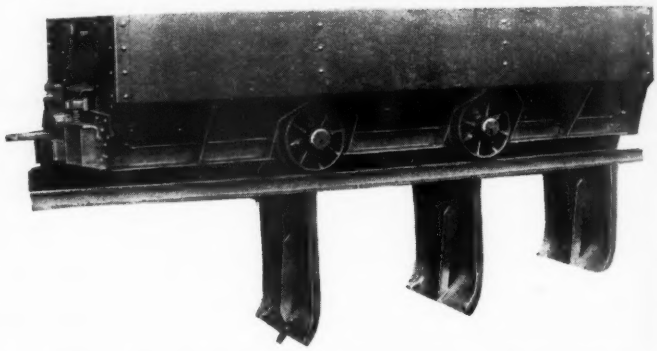
S-D "Automatics" Now Being Used In England

★ S-D "Automatics" are world-famous. Their ability to cut the cost of producing coal is universally recognized and day after day more mines are junking their old type cars and putting in S-D "Automatics".

Why not? Isn't this the sane thing to do? How can it be otherwise when it has been proved again and again and again that the cost of producing coal is reduced somewhere between 25c and 55c per ton by the change-over to "Automatics"? And, why not change over as soon as you possibly can when you can rent the new S-D "Automatics" at an average cost, over a fifteen year period, which will be somewhat less than 2 cents for each ton of coal handled by the cars, and when you are saving more than ten times 2 cents a ton? You have no initial car cost . . . you have a guarantee on repair cost while the cars are being rented . . . you have an option to purchase them at any time at lower and lower cost. In many cases enough money is saved in four months to purchase the cars outright.

Our job is to make a little profit on these cars by letting you make a whale of a big profit by using them. If you'll give us a chance, we can quickly prove to you that we can do exactly this.

Let us also remark in passing, that we manufacture the largest capacity automatic drop-bottom cars in the world for the same over-all dimensions, and, by-gum, they are the strongest, sturdiest, sweetest-running, best stay-on-the-trackers, and altogether the most satisfactory and superlatively charming cars you ever saw.

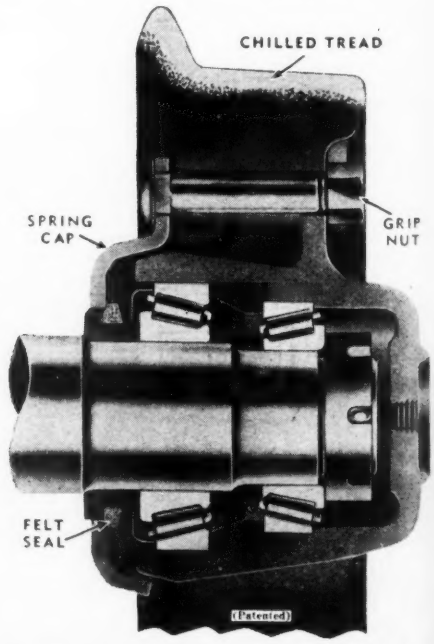


The Ben Hur Coal Co. car, an S-D 1-2-3 "Automatic" loaded by conveyor, and used for main line haulage, has 12 ft. sides, 28 in. height, with a w.l. capacity of 152 cu. ft., and averaging 4 to 5 tons per trip.

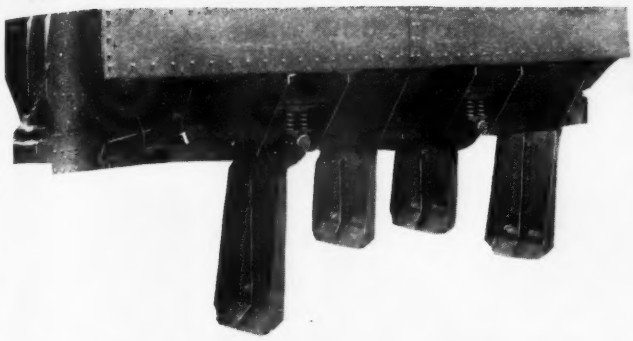
Here is an S-D 1-2-3 "Automatic" underground transfer car that is well known. Note the 6-door construction for discharging coal on to moving conveyor. This car has 15 ft. sides and 40 in. height, with a w.l. cap. of 254 cu. ft., but it averages hauling 8 to 9 tons of coal.

Demountable Car Wheels

Closed front hubs—no caps to get loose or leak lubricant. Wheel castings are in one piece. Note the beautiful sealing of inside hub preventing the escape of lubricants or entrance of dirt. When wheels are removed from axle, bearings stay in place on journals and require no further adjustments.



Sanford-Day Iron Works, KNOXVILLE, TENNESSEE

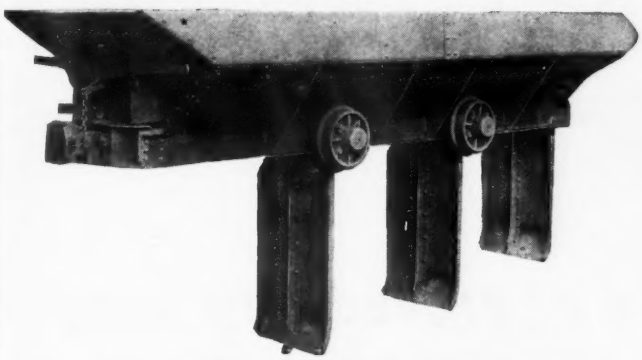


This S-D 1-2-3 "Automatic" is today the largest underground automatic mine car we know of. It has over 19 ft. sides, is 52 in. high, with a w.l. cap. of 387 cu. ft. It is averaging 11 to 12 tons per trip on main line haulage underground for The Consolidated Coal Co.

• • •

The Sandlick Coal Co. uses this S-D 1-2-3 "Automatic" with low rear end to facilitate mechanical loading. It has 14 ft. sides and height of 32 in. with a w.l. cap. of 228 cu. ft., but it averages 5½ to 6 tons per trip.

• • •

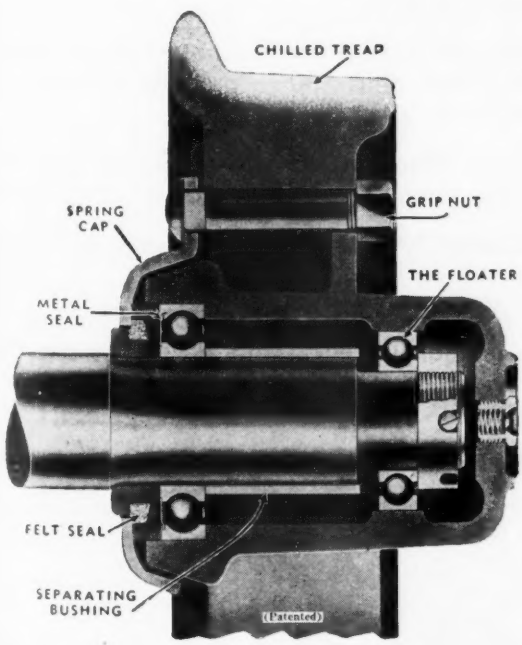


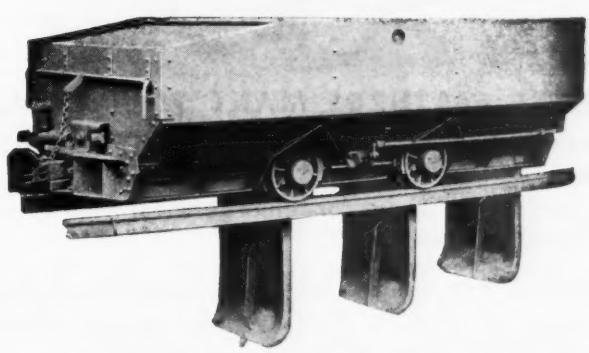
Here is an S-D 1-2-3 "Automatic" built with over-lapping ends for continuous conveyor loading. It has 14 ft. sides, is 42 in. high, w.l. cap. 204 cu. ft. and averaging 5½ to 6 tons of coal. Has automatic couplers.

• • •

The Big Jim Coal Co. uses this S-D 1-2-3 "Automatic"—a low boy with a height of only 18 in. and sides of 12 ft. It has a w.l. cap. of only 62 cu. ft., but is averaging 2¼ to 2½ tons of coal per trip.

• • •





This S-D 1-2-3 "Automatic" built for the Jamison Coal and Coke Co., has 11½ ft. sides, is 47 in. high, with a w.l. cap. of 228 cu. ft. Its sloping sides at rear are to facilitate mechanical loading. It is averaging 5½ to 6 tons of coal per trip.

Sanford-Day Iron Works, KNOXVILLE, TENNESSEE

Tim Malloy says...

The Wheat lamp suits me because it is safer. Boy, what a relief to know there is nothing in the Wheat Lamp to injure a healthy body.

WHEAT *the approved cap lamp*

THESE FEATURES MAKE *WHEAT* THE OUTSTANDING ELECTRIC CAP LAMP

- Two bulbs (one for emergencies)—miner is never in the dark.
- Headpiece weighs less than 6 ounces, Lamp Cord 6 ounces, Battery 62 ounces—Total weight of Lamp complete, 74 ounces.
- Headpiece molded of strong bakelite, sealed, moisture-proof and dust-proof.
- Rubber battery case—non-conductor of electricity—a valuable safety feature.
- Battery solution (free) limited to one ounce total both cells.
- Lead-acid type battery maintains high voltage throughout shift (80+ percent efficiency)—year after year.
- Battery charged through headpiece and cord of cap lamp—a daily test of all connections.
- Designed for self-service charging system for lowest lamp-house operating cost.
- To charge, headpiece is simply slipped on to key in charging rack, and turned to make contact. Nothing to take apart—unit-sealed construction.

Write today—
WHEAT LAMP SALES, INC.
1501 Kanawha Valley Bldg.
Charleston, W. Va.

MANUFACTURED BY
KOEHLER MFG. CO.
MARLBORO, MASS.
SPECIALISTS IN MINE LIGHTING FOR 30 YEARS

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ENGINEERED BY
ALL THREE

Each U.S. Rubber Conveyor Belt is "custom-designed" by our technical staff to meet requirements determined by two other engineering groups—your own operating engineers, and those who produce the mechanical conveyor equipment.

The skill of our rubber belting engineers must be coordinated with your plans and equipment designs. It is our responsibility to produce the belt or belts which will serve economically and efficiently under the specific conditions...conditions which vary with every installation.

That policy has been followed in thousands of U. S. Rubber Conveyor Belt installations; it is one worthy of your careful consideration in your next conveyor belt purchase.

SERVING THROUGH SCIENCE **WITH ENGINEERED RUBBER CONVEYOR BELTS**

UNITED STATES RUBBER COMPANY

1230 SIXTH AVENUE, ROCKEFELLER CENTER, NEW YORK 20, N. Y. • *In Canada:* **DOMINION RUBBER CO., LTD.**

From Patterns To Coal Production—

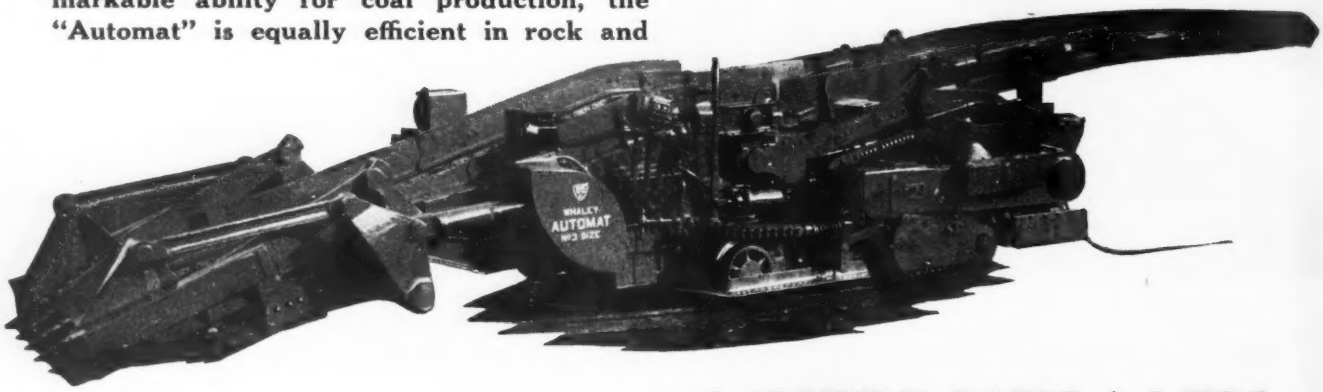
★ Engineering of mechanical loading machines and full control of manufacture from the patterns to finished machine has been our all-out job for over 37 years.

From the time we developed the first commercially successful underground loading machine, our single purpose has been to give to the mining industry the most dependable, most effective loader for maximum production at lowest cost.

We have achieved this goal with the Whaley "Automat". In addition to its remarkable ability for coal production, the "Automat" is equally efficient in rock and slate work . . . an all-purpose machine wherever it serves.

Our 37 years of experience in building mechanical loaders exclusively is available to you for the asking. We will be glad to discuss your production plans for the future. Myers-Whaley Company, Knoxville 6, Tennessee, U.S.A.

"Wm. Neill & Son, Ltd., St. Helen's Junction, Lancashire, England, are Licensed for Manufacture and Sale in Great Britain and Europe."



MYERS-WHALEY

Mechanical Loaders Exclusively for Over 37 Years

High Speed TROLLEY HAULAGE Keeps Tonnage Moving at Willow Grove

Smooth, one-level trolley wire and well-groomed road bed allow haulage speeds of 25 to 30 m. p. h. at Willow Grove. Although built in 1934, comparatively little maintenance is required to keep this haulageway in top operating condition.

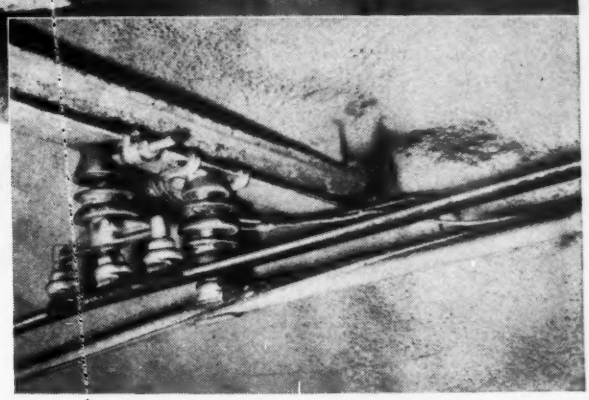
One-Level Trolley Wire Plus Well-Groomed Roadbed Bring Haulage Efficiency to Modern Hanna Property

OPERATING "round-the-clock", Hanna Coal's Willow Grove mine keeps record tonnage speeding to the tipple and into America's war machine. Because haulage speeds of 25 to 30 m. p. h. are routine, a smooth, one-level trolley wire and well-groomed road bed are absolutely essential.

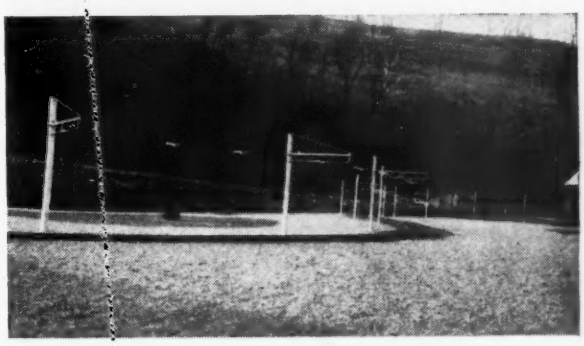
At Willow Grove, O-B materials support both trolley and feeder for inside and outside haulageways. You'll find them used, too, on the power sectionalization system -- Safety Feeder Switches at entries, between substations and other locations where power under heavy load must be broken; Section Insulator Switches approximately every 1500 feet along the haulage roads. Since Willow Grove standardizes on shoes for main-haul current collection, the trolley wire is conditioned at regular intervals with O-B Trolley Wire Lubricant.

That O-B products have been permitted to play an important part in this modern operation is a splendid testimonial to their ability to do a job effectively and economically. They can do the same type of job for you at your mine.

2853-M

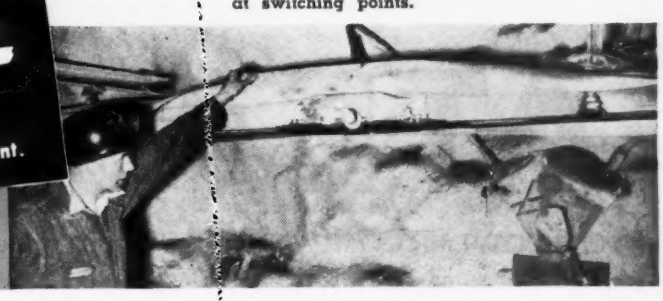


Three Bulldog Clamps held in place lengthwise on the wire by a Triple Supporting Yoke prevent the trolley wire from kinking at curve suspension points.



The outside haul at Willow Grove rivals the inside for transportation efficiency.

O-B Section Insulator Switch and Safety Feeder Switches contribute to the well-planned sectionalization system. Trolley is guarded with rubber hood at switching points.

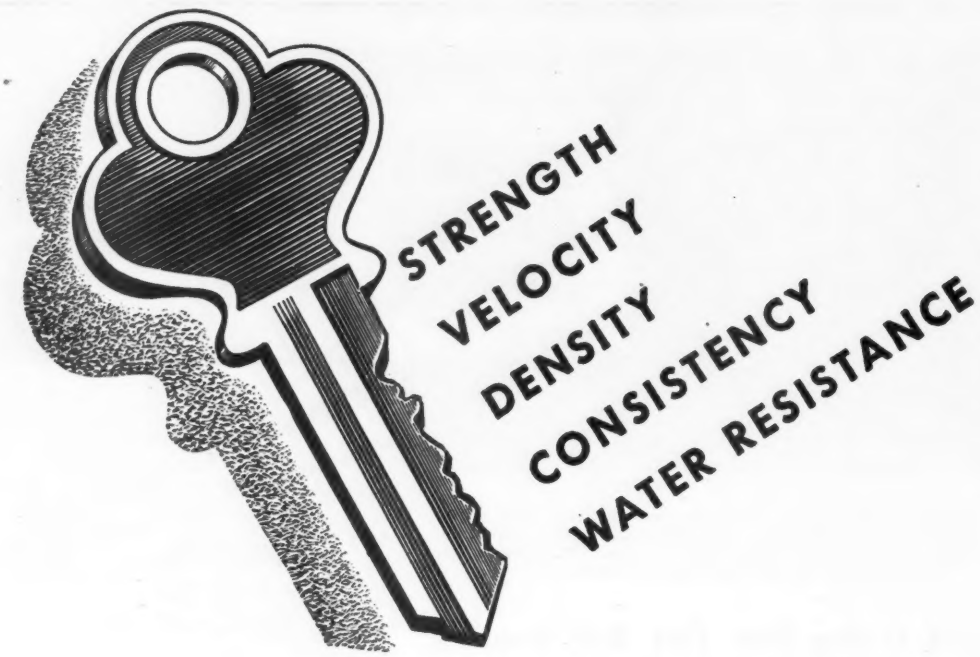


Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

The Right Explosive Fits the Job Like a Key Fits a Lock



Choosing the right explosive is like picking out the right key to open a lock.

In a key, it's a matter of having the right combination of notches.

In an explosive, it's a matter of the right combination of properties. Strength, density, velocity, water resistance, consistency must all be properly balanced for best results.

In order to get just the right balance of properties, Atlas makes over 120 kinds and grades of explosives.

The Atlas representative has a specialized knowledge of these explosives and what they can do. You have a specialized knowledge of your ore and your operating methods.

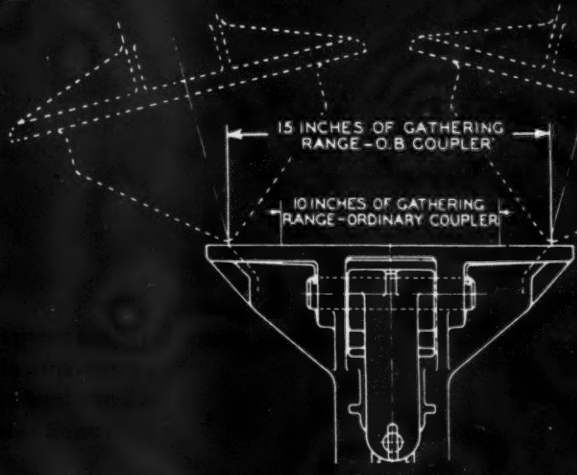
Combine your knowledge of your job conditions with the Atlas representative's specialized knowledge of explosives to get out more ore at less cost.

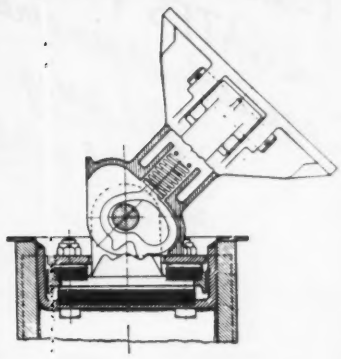
ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • ***Offices in principal cities*** • ***Cable Address—Atpowco***

Why Put a Round Peg in a Square Hole?





Springy rubber draft gears (colored areas) used on O-B Automatic Couplers will absorb up to 50,000 lbs. impact as compared with the 12,000 to 15,000-lb. capacity of steel draft springs.

For Top-Notch Haulage Performance Install O-B Automatic Couplers—A Coupler Designed Specifically to Meet Mine Operating Conditions

● Trying to adapt a standard railroad coupler to a mine car is like putting a round peg in a square hole. In mines, curves are shorter and coupling on curves more frequent . . . cars are smaller and overhangs greater . . . impact blows from surging are much more severe.

Knowing this, O-B engineers wiped their slate clean and started fresh, designing a coupler specifically to meet mine operating conditions. First to go was the traditional end-for-end design. More badly-needed gathering range could be provided with male and female coupler heads. Next, an automatic centering device was added to eliminate manual alignment of coupler heads, an important safety feature in keeping men out of the "danger zone." Third, breakable steel draft springs were replaced with non-breakable rubber draft gears of much greater shock absorbing capacity.

If you are considering the purchase of new mine cars, investigate the O-B Automatic Mine Car Coupler—a coupler designed specifically to meet mine operating conditions. A postcard inquiry will bring full information.

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

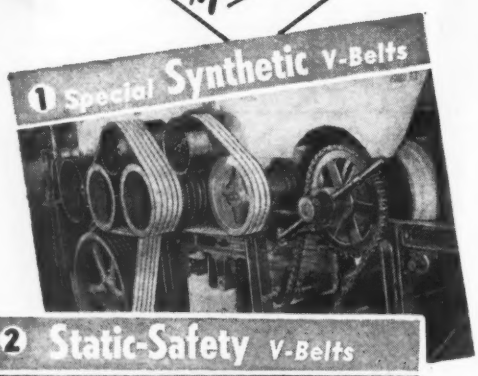
KEEP BUYING WAR BONDS

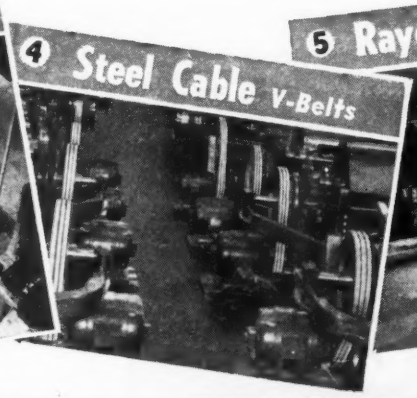
2552-AM

Today GATES Synthetic Rubber V-Belts

— are giving *BETTER SERVICE* than any V-Belts Ever Made of *NATURAL RUBBER!*

-and there is a GATES V-Belt precisely engineered to fit any special need





No V-Belts built by *anyone* before the war could stand the service now daily delivered by Gates V-Belts on army tanks, tractors and self-propelled big guns. Gates has developed these greatly superior VBelts through intensified, specialized research—and Gates is building these belts entirely of *synthetic rubber!*

The important point, for industrial V-Belt users, is this:— Every improvement developed by Gates for these Army V-Belts has also been added, day by day, to the quality of the standard Gates Vulco Ropes which have been delivered to you.

As you know, war-time improvements in many *other* products must be withheld from general use until after the war is won—but victory depends so directly upon *production*, and production so directly upon V-Belts which drive the producing machines, that Gates has been able to give you *immediately*, in your Standard Gates Vulco Ropes, every V-Belt improvement which Gates specialized research has developed for use in the Army's motorized equipment.

In addition, where V-Belts of special construction are required, your Gates Rubber Engineer is in position to supply a Gates V-Belt that is precisely engineered to meet your special needs.

Whatever drive problem or V-Belt problem you may have, you need only pick up your phone book and look under the heading "Gates Rubber." The Gates Rubber Engineer will bring right into your plant the full benefits of every advance in V-Belt construction and in drive operation that Gates specialized research has developed.

THE GATES RUBBER COMPANY

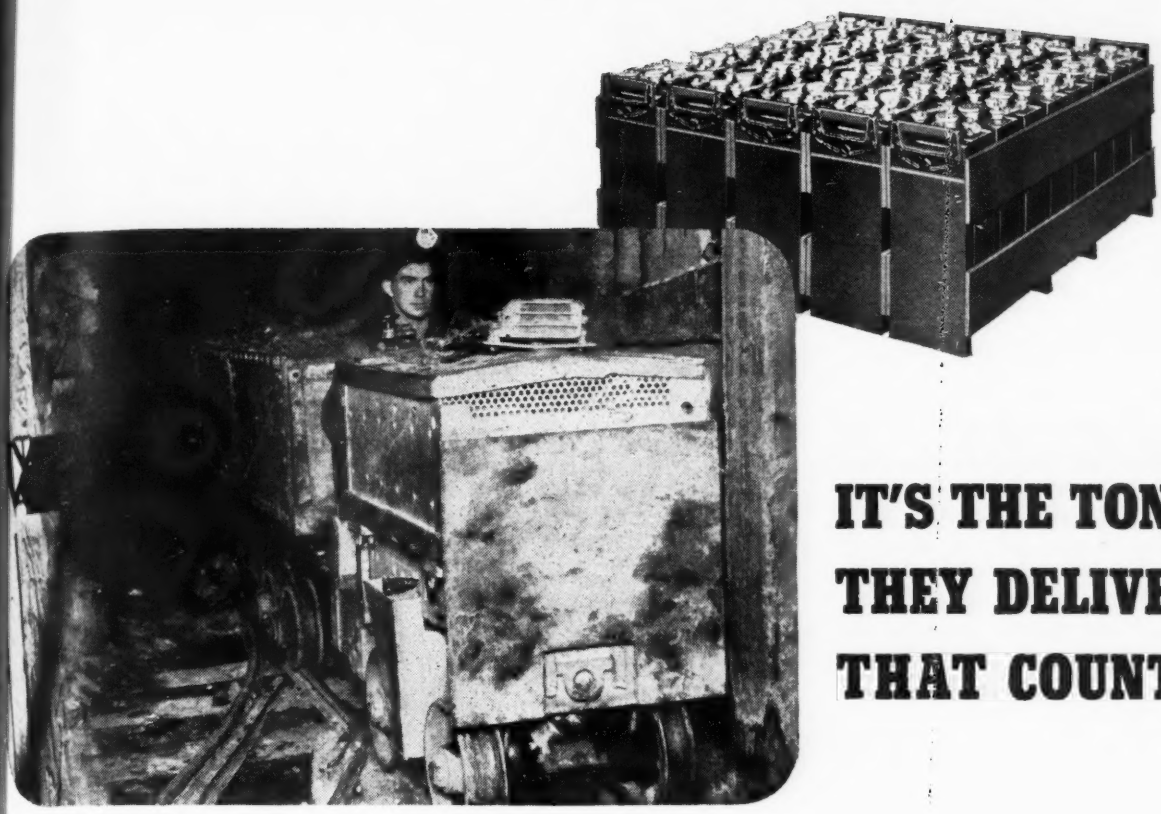
Engineering Offices and Stocks in All Large Industrial Centers

Gates

THE MARK OF SPECIALIZED RESEARCH

GATES VULCO ROPE DRIVES

CHICAGO 6, **ILL.** 549 West Washington
NEW YORK CITY 3, 215-219 Fourth Avenue
ATLANTA 3, **GA.** 738 C & S National Bank Building
LOS ANGELES 21, **CAL.** 2240 East Washington Boulevard
DENVER 17, **COLO.** 999 South Broadway
DETROIT 4, **MICH.** 8663 Grand River Avenue
PORTLAND 9, **ORE.** 333 N. W. 5th Avenue
DALLAS 2, **TEXAS** 1710 N. Market Street
SAN FRANCISCO 3, **CAL.** 1090 Bryant Street



IT'S THE TONNAGE THEY DELIVER THAT COUNTS

In Mine Locomotives and Shuttle Cars Alkaline Batteries Give You These Important Advantages

- They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents.
- They can be **charged rapidly;** do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.
- They can **stand idle indefinitely** without injury. Merely discharge, short-circuit, and store in a clean, dry place.
- They are **simple and easy to maintain.**

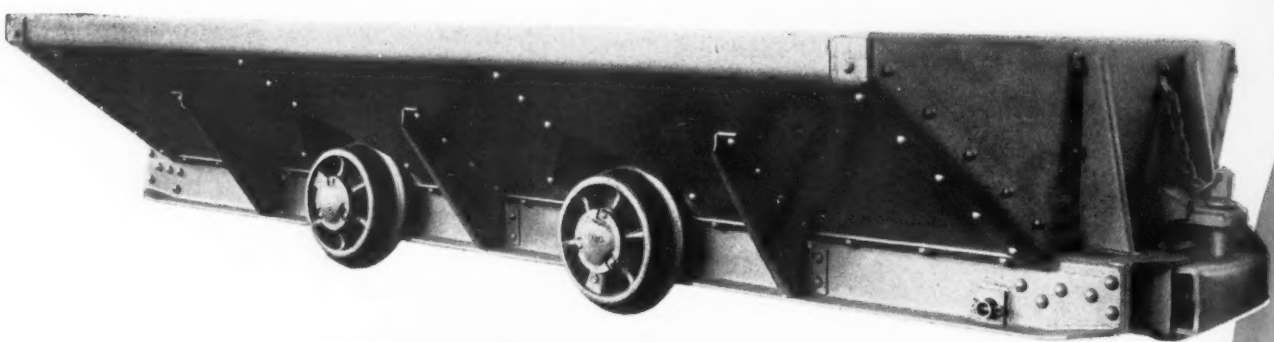
Keeping maximum production of coal or ore coming out puts a premium on availability of underground haulage and tramming equipment.

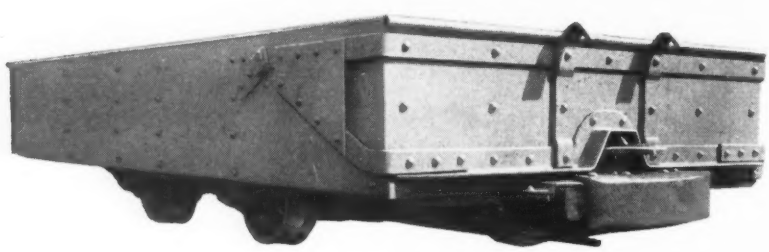
Time and experience have demonstrated that the unequaled dependability of Edison alkaline batteries gives the closest approach to failure-free, uninterrupted haulage it is possible to obtain. They stay on the job and out of the repair shop . . . give longer service life than any other type of battery. In fact, alkaline batteries that have been "worn out" in locomotive or shuttle-car service, are often used for various kinds of lighter duty standby work for which their capacity is still ample, and there deliver more years of dependable service.

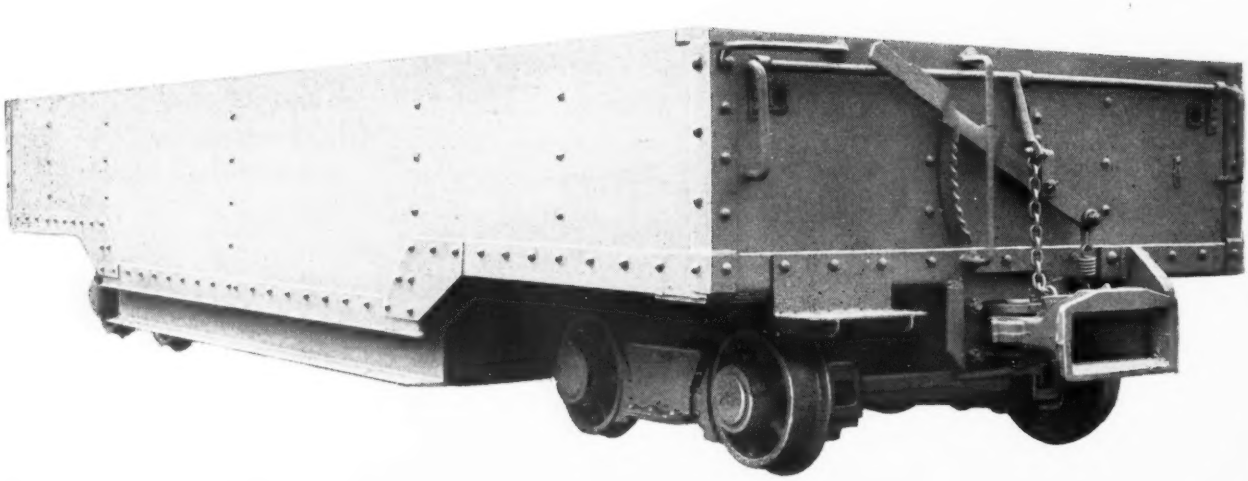
Because they give such long, trouble-free life and are so simple to maintain, alkaline batteries also help keep down haulage costs. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J.*

Edison
ALKALINE BATTERIES

Wheels that Help Turn the WHEELS OF WAR

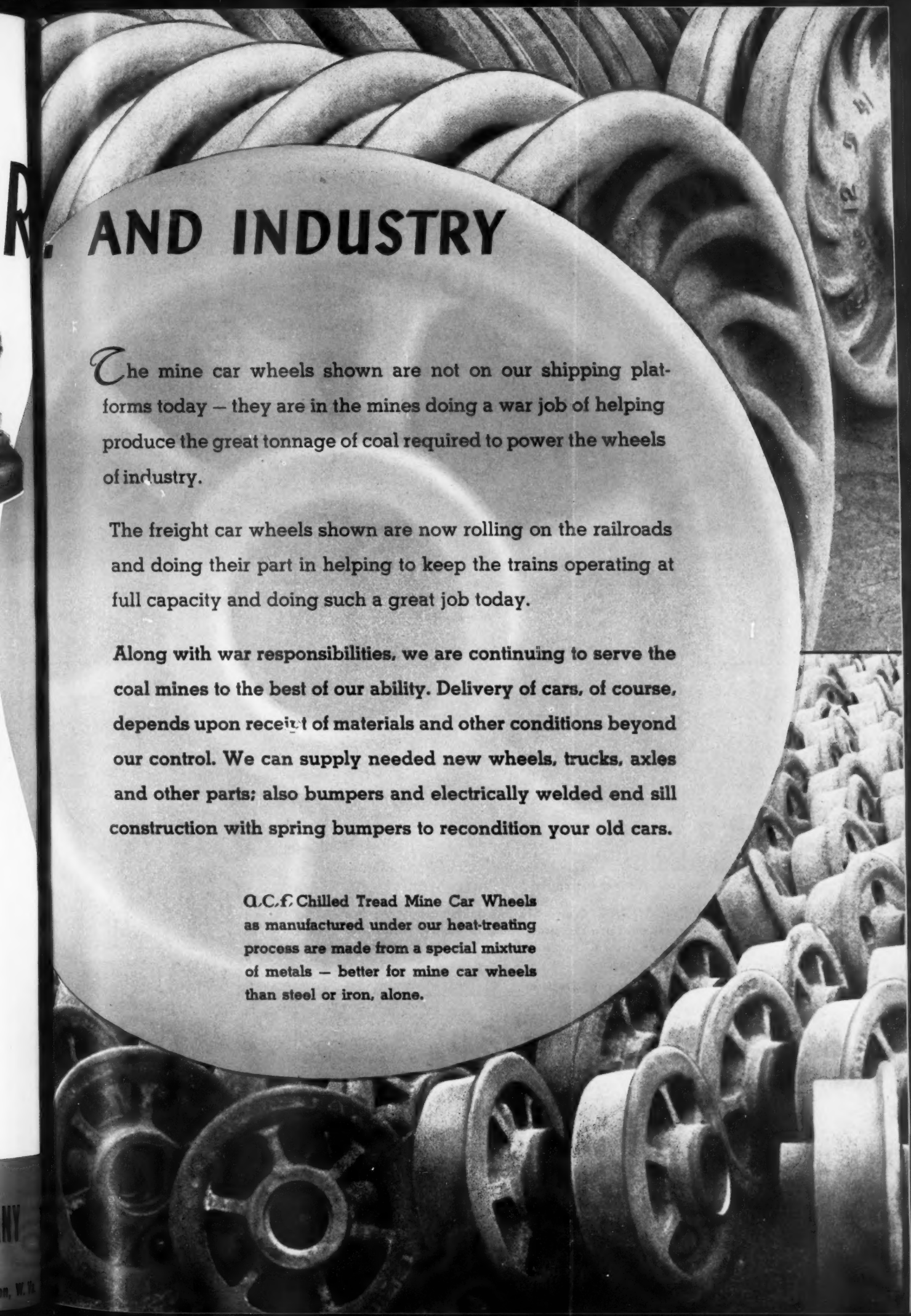






a.c.f. AMERICAN CAR AND FOUNDRY COMPANY

New York • Chicago • St. Louis • Cleveland • Philadelphia • Berwick, Pa. • Pittsburgh • Huntington, W. Va.



R. AND INDUSTRY

The mine car wheels shown are not on our shipping platforms today — they are in the mines doing a war job of helping produce the great tonnage of coal required to power the wheels of industry.

The freight car wheels shown are now rolling on the railroads and doing their part in helping to keep the trains operating at full capacity and doing such a great job today.

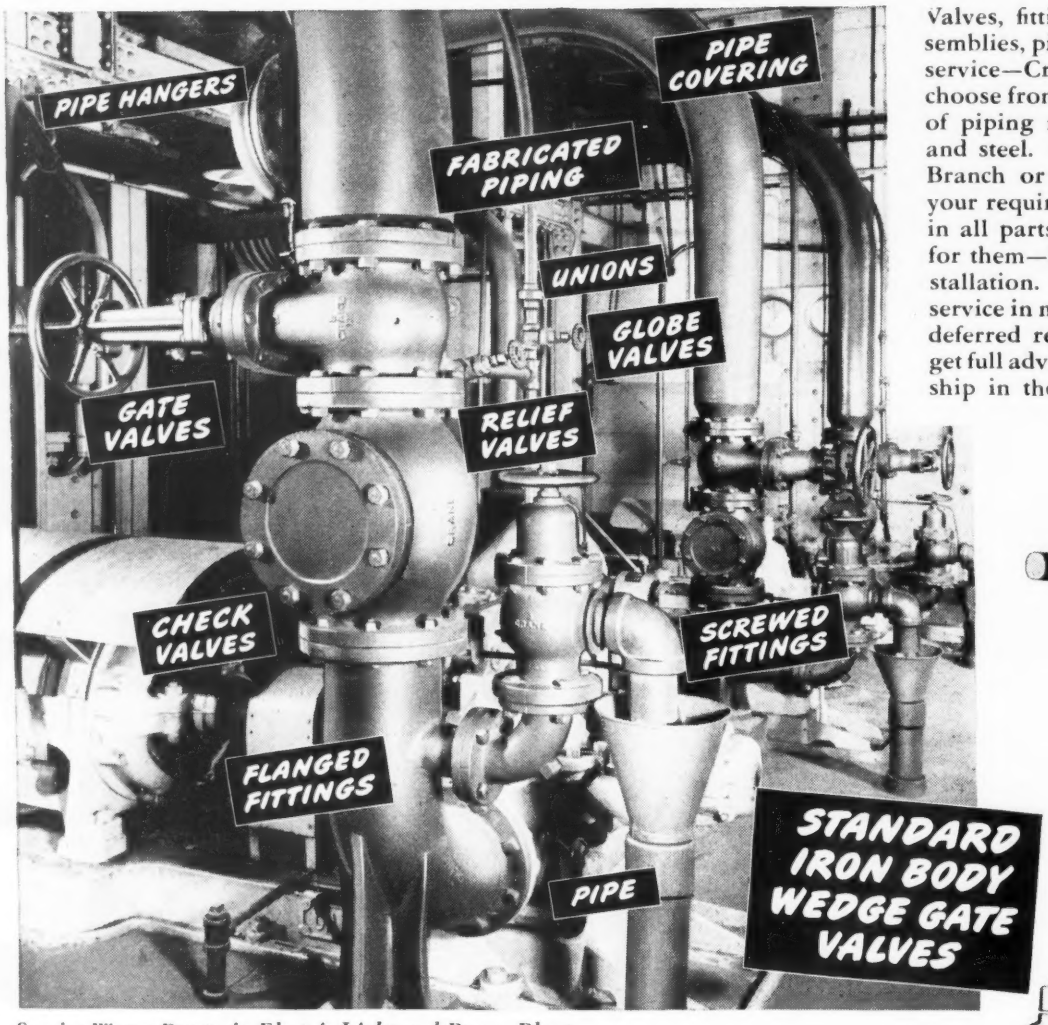
Along with war responsibilities, we are continuing to serve the coal mines to the best of our ability. Delivery of cars, of course, depends upon receipt of materials and other conditions beyond our control. We can supply needed new wheels, trucks, axles and other parts; also bumpers and electrically welded end sill construction with spring bumpers to recondition your old cars.

A.C.F. Chilled Tread Mine Car Wheels as manufactured under our heat-treating process are made from a special mixture of metals — better for mine car wheels than steel or iron, alone.

For every part of Piping Systems depend on the Complete Crane Line

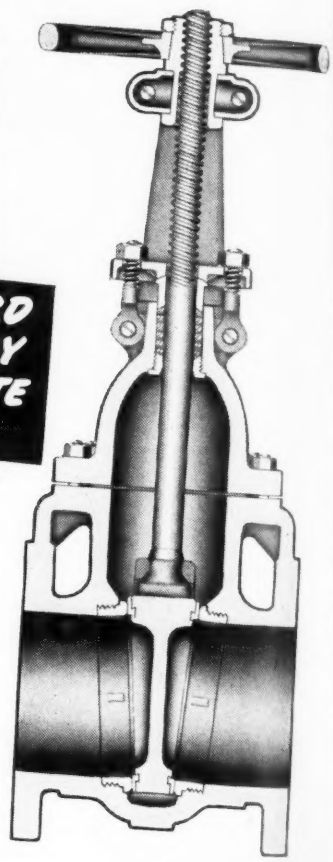
ONE SOURCE OF SUPPLY . . . ONE STANDARD OF QUALITY

ONE RESPONSIBILITY FOR ALL PARTS



Service Water Pumps in Electric Light and Power Plant.

Valves, fittings, pipe, fabricated assemblies, piping accessories—for any service—Crane supplies them all! You choose from the world's greatest line of piping materials—in brass, iron and steel. One source—your Crane Branch or Wholesaler supplies all your requirements. Uniform quality in all parts—and one responsibility for them—helps you get the best installation. Keep this *complete* Crane service in mind to simplify and speed deferred replacement work—and to get full advantage of 90 years' leadership in the piping equipment field.



SERVICE RECOMMENDATIONS: **Crane Standard Iron Body Wedge Gate Valves** with brass trim are recommended for steam, water and oil lines; all-iron valves for oil, gas and fluids that corrode brass. Made in OS&Y and Non-Rising Stem patterns.

Working Pressures

Size of Valve	Screwed or Flanged Valves		Hub End Valves
	Saturated Steam	Cold Water, Oil, or Gas, Non-Shock	Cold Water or Gas Non-Shock
2 to 12 in.	125 pounds	200 pounds	200 pounds
14 and 16 in.	125 pounds	150 pounds	150 pounds
18 to 24 in.	*	150 pounds	150 pounds

*For steam lines larger than 16-inch, Crane 150-pound Cast Steel Gate Valves are recommended.

CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. · *Branches and Wholesalers Serving All Industrial Areas*

CRANE

90 YEARS OF PROGRESS 1855 1945

VALVES • FITTINGS • PIPE

PLUMBING • HEATING • PUMPS

The LIFELINE of the Mine

"This cable's got everything it takes to stand rough treatment," says Romey.*

*Copr. 1945 RCC

Long life, as measured by months of trouble-free service on the toughest job in the mine, is built into every inch of Rome "60-38" Single Conductor Locomotive Gathering Cable.

The ideal Locomotive Cable with complete adhesion between copper conductor and the insulation. It is protected overall with a tough Neoprene jacket. This cable is recommended for electric locomotives of the gathering reel type or any other service requiring a flexible, heavy duty portable cable, where extreme adhesion of the insulation to the conductor is desired.

THE CONDUCTOR is composed of rope stranded, tinned copper wires. The individual ropes are laid up in a special manner to resist both tension and torsion.

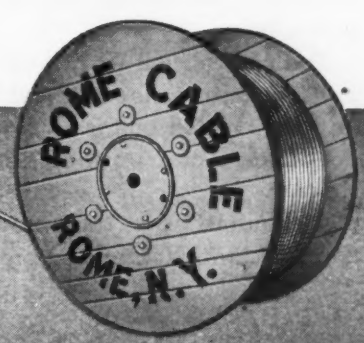
A SPECIAL INSULATION is used, which has high electrical qualities and extreme adhesion to copper conductor, which prevents separation of the conductor from the jacket.

HEAVY TWINE REINFORCEMENT CORDS are applied over insulation to strengthen the cable and control adhesion between insulation and jacket.

THE NEOPRENE JACKET is vulcanized in continuous lead molds and has a high tensile strength, maximum resistance to tearing and abrasion, and long aging characteristics.

FROM BAR TO FINISHED WIRE

ROME CABLE
CORPORATION
ROME • NEW YORK



NO MORE DAMAGING Bump-Bump-Bump

Every so often there's a radical improvement in some item of mine-track equipment. Right away people ask, "Why didn't somebody think of that before?"

Improvements don't "just happen." They usually result from long experiment and research. For example, the track bolt used with Bethlehem's new splice bar was designed and thoroughly tested for strength by a prominent mine operator. When other mine operators first saw the new bar and bolt design, they immediately recognized its advantages for 40-pound track.

The pictures tell why. Note how the new-type bar fits closer to the rail web . . . and how the new flat-headed bolt is so hidden that even the deep flange of a worn or a new wheel cannot strike it.

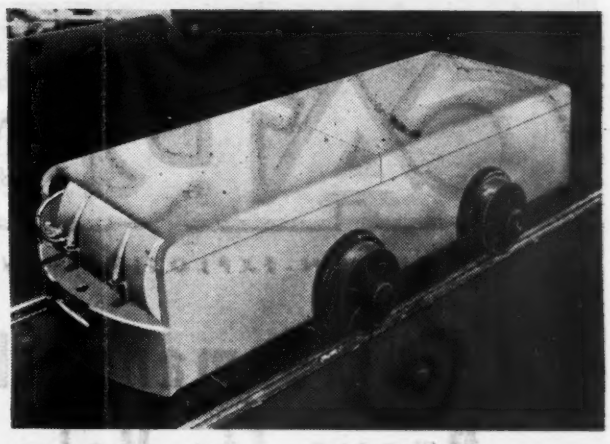
In contrast, the usual round-headed track bolt (used with angle bars) protrudes far beyond the rail head, so that when the deep-flanged wheels of a motor, cutter, or loader pass over it, the flanges invariably strike the bolt a damaging blow. These continued shocks not only necessitate frequent bolt replacements; eventually they tend to injure control devices in the machines themselves.

You can cut down drastically on bolt losses—and avoid shaking up your expensive machinery—by switching to Bethlehem's new splice bar and track bolt. Next time you plan to move your 40-pound rails or install another layout, ask a Bethlehem man for full details.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

★ ★ ★ BETHLEHEM STEEL ★ ★ ★

YOU MAY THINK YOU DON'T NEED IT—



—but, as a matter of fact, you'll wonder how you got along without a Cantrell Compressor once you have put it to work.

You see, Cantrell Compressors are different. They are designed and built at a cost that every mine can take advantage of several of them if necessary, for the many "Johnny-on-the-spot" services a good compressor can render to save time and money in a mine. No fancy sales gadgets on them but they are built to perfection for faithful, constant service at all times.

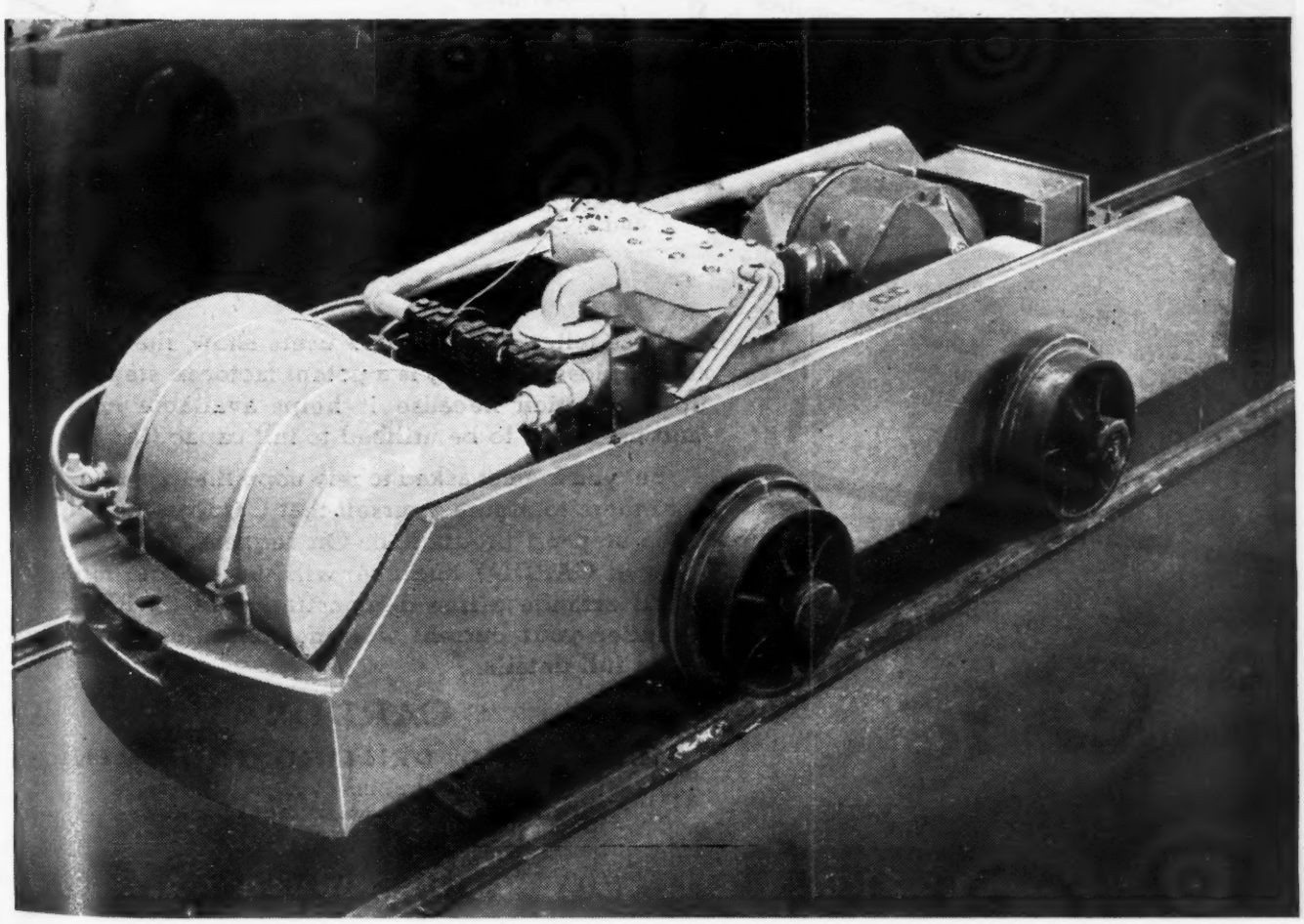
The Cantrell Compressor is built in four types to meet every coal mine requirement—

1—Type SP, a complete job, self-propelling, a combined locomotive and compressor in one machine.
2—Type OMC, complete with trucks, but not self-propelling.
3—Type G-1, equipped with rubber-tired wheels for trackless movement.
4—Type SL, without trucks for mounting on permanent base in shop, or in mine car for transportation in mine.

An exclusive feature of the Cantrell is our compressor exchange plan. An arrangement that eliminates your time and expense of compressor repairing, doing without the services of your compressor. A plan that provides you with a factory rebuilt compressor unit and, within an hour, your old one is replaced at a very low cost. Write for complete information to, Imperial Bronze Mfg. Co., Jellico, Tennessee.

● Shown on this page is the Cantrell Type OMC compressor. It is only 8 Ft. 8 in. long and 26 in. high above rail and completely protected by solid bottom and quickly removable safety top, as shown in photo directly above. Note in photo below, the Cantrell "After-Cooler" between cylinder head and air receiver—an important compressor advantage in the Cantrell. The main frame constitutes a 25 gallon water capacity cooling system, with water under constant forced circulation.

Cantrell COMPRESSORS



CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

Performance Records Prove Its Value As A *Production Booster*

USER COMMENTS

"Cardox has proved to be an asset to us on our mechanical loader. We have also found that it leaves us a firmer top, as well as firm, straight ribs."

"Since our mine is almost 100% mechanized, we find that by using Cardox there is little or no interference with the operating cycle. *Crew and machines are utilized to full capacity . . . idle time is eliminated . . . production costs per ton of output are lowered . . .* because Cardox does not produce smoke or noxious fumes, and coal can be broken down as often as men and machines can load it."

"Our entire tonnage is hand loaded, and as we operate on double and triple shifts, the absence of smoke and fumes permits us to complete our cycle of operation. We find, too, that Cardox rolls the coal out from the working face for easy loading."

"Cardox rolls the coal out from the face in firm sizes for easy loading. There is no smoke or fumes. This permits the miners to immediately return to the face after the coal has been broken down."

"We are very much pleased with the results we have gotten with Cardox. A worthwhile advantage from a production standpoint is that a loader can immediately start work after his place has been shot."

As these letters from Cardox users show, the use of non-explosive mining is a potent factor in stepping up production because it helps available crews and machines to be utilized to full capacities.

But you are not asked to rely uopn the experience of others to assure yourself that Cardox will help you step up production. On request, an experienced CARDOX engineer will survey your mine and arrange a free demonstration of CARDOX under your current working conditions. Write for full details.

CARDOX

HARDSOCG DRILLING EQUIPMENT

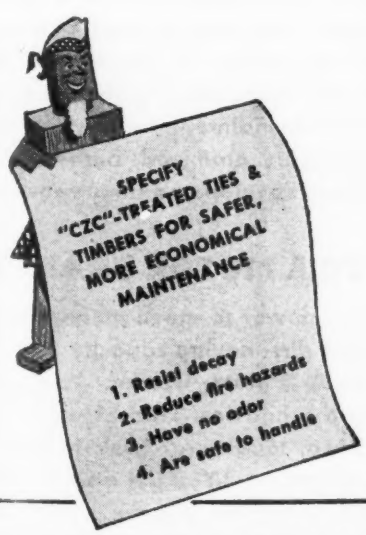
Complete line of drilling equipment designed to give you the maximum in drilling efficiency.

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS

Can you answer these questions about your mine?

Do you know...

1. The life expectancy of a haulage tie?
2. How much you would save by using "CZC"-treated ties?
3. In what other parts of your mine would "CZC"-treated timber help you to reduce operating costs—improve mine efficiency—increase mine safety?


SPECIFY
"CZC"-TREATED TIES & TIMBERS FOR SAFER, MORE ECONOMICAL MAINTENANCE
1. Resist decay
2. Reduce fire hazards
3. Have no odor
4. Are safe to handle

The answers to these questions and many others are found in the booklet, "Wood Preservation for Mines," published by Du Pont and sent to you free, on request. It is profusely illustrated and contains several charts of maintenance costs and research tests.

Chromated Zinc Chloride (CZC) is an improved wood preservative with which ties and timbers may be impregnated to resist decay, reduce fire hazards and increase, by as much as *six times*, their useful life!

Don't wait until you need or can get new timber before studying the advantages of "CZC." Write for the booklet, and be ready. Fill out the coupon below today.

TO CONSERVE—PRESERVE!

DU PONT CZC

(CHROMATED ZINC CHLORIDE)

WOOD PRESERVATIVE

DU PONT REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Delaware.

Please send me your booklet **"Wood Preservation for Mines."**

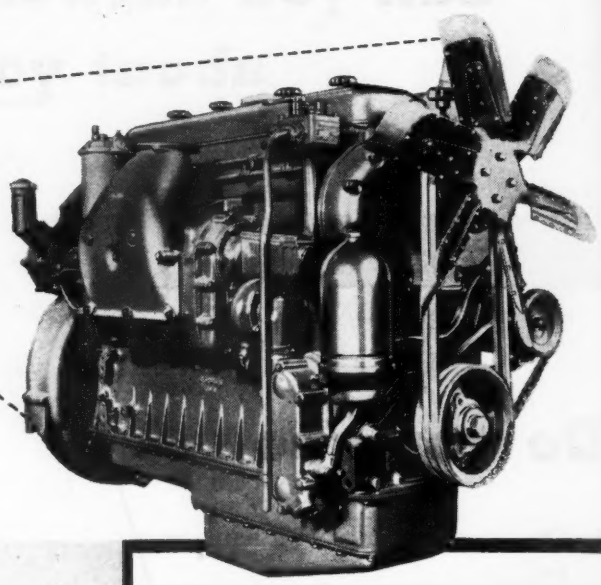
Name_____

Address_____

City or Town_____ State_____

WATCH 2-CYCLE!

The Modern Diesel for Modern Miners



Keep your eyes on 2-cycle Diesel tractors and motor graders! Out to smash all operating records . . . these units will play an important part in speeding up and cutting the cost of stripping, road-building, cleaning up. When they are working in your territory . . . check their performance . . . satisfy yourself that 2-CYCLE is the kind of power you want.

WHAT 2-CYCLE DIESEL POWER MEANS:

TO A TRACTOR

It means *plenty of drive!* Every down stroke of the piston is a power stroke. It means *smoother power*—maintains high torque over a wide speed range. It means *faster power*—there is quick pick-up . . . less gear-shifting . . . high-speed operation. It means *thrifty power.* Unit injectors simplify fuel system, reduce maintenance cost — fuel is thoroughly atomized, burns completely and develops maximum power.

TO A MOTOR GRADER

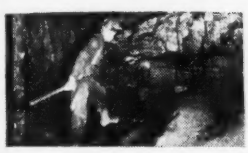
It means power to move *more material.* Extra dirt-moving capacity is built into the A-D Motor Grader. You can handle the heaviest kind of work — from deep, tough scarifying to high, heavy, bank cuts. You get a *smoother job,* too — has the reserve power to carry you through tough cuts with fewer blade adjustments. Gets the job done *faster*—works in a higher gear!

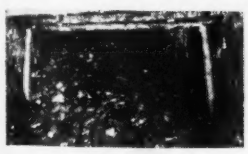
KEEP AN EYE ON THE FUTURE

BUY AND KEEP WAR BONDS

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.





AMERICAN
CYANAMID & CHEMICAL CORPORATION
EXPLOSIVES

Speed your coal preparation

The transportation and handling of coal in the preparation plant may cause "bottlenecks" which handicap production. More often it is some unsuspected factor . . . such as the use of an incorrect explosive in face preparation. Therefore . . .

Select explosives proved by years of service . . .

AMERICAN permissibles and electric blasting caps, products of intensive research, chemical control, thorough inspection and unremitting care in manufacture have proved their merit through years of satisfactory service in representative coal mines.

- ★ **HIGH EXPLOSIVES**
- ★ **PERMISSIBLES**
- ★ **BLASTING POWDER**
- ★ **BLASTING ACCESSORIES**

• *Capable field engineers are available at your call.*

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.
EXPLOSIVES DEPARTMENT

SALES OFFICES: PITTSBURGH, Pa. Bluefield, West Va. Scranton, Pa. St. Louis, Mo. Chicago, Ill. Pottsville, Pa. Hazleton, Pa. Maynard, Mass.

The ~~"art"~~ *Science* of greasemaking—and you, the "user"

NOT MANY YEARS AGO, the "art" of greasemaking was handed down from father to son, or from the master greasemaker to his favorite apprentice. The greasemaker was a super-chef—his recipes a secret. Without

The "art" of greasemaking was handed down from father to son.

the magic word known only to the old-timer, the same ingredients and seemingly the same methods he used, produced anything but the expected results in the hands of the uninitiated apprentice.

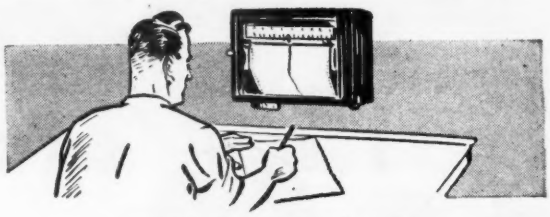
Today, that picture is greatly changed. Greasemaking

The master greasemaker was a super-chef—his recipes a secret.

is no longer an art but a science. The "know-how" of the old-timer is duplicated and improved upon in the chemist's laboratory.

Control of the various steps in the process, once dependent upon the experienced "eye" of the greasemaker, has been taken over by modern scientific instruments—accurate measuring and weighing devices, precision temperature control instruments, scientific mixing kettles, etc.

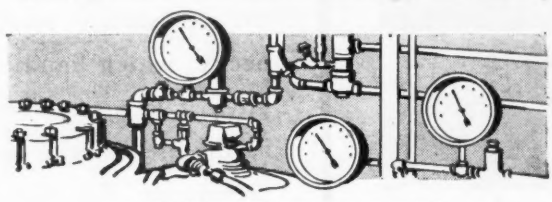
A high degree of skill is still required, but it is in the hands of thoroughly trained greasemakers, who, with accurate instruments and with laboratory formulae and methods, can predetermine the results of their



. . . accurate temperature measuring instruments.

labor and get uniform products that accurately meet specification requirements.

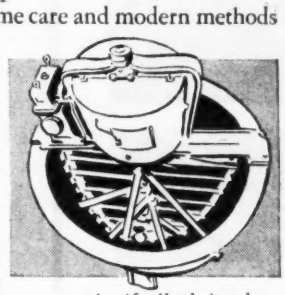
There was a time, too, when grease quality and consistency meant very little. The consistency of an axle grease on a wagon wheel had little effect on the speed of the wagon or life of the wheel. Today, however, high speed, precision anti-friction bearings, and heavily



. . . with laboratory formulae and methods.

loaded gears require accurate lubricant recommendations to save both power and wear.

All this explains why you will find the most advanced equipment and technique employed in the greasemaking department of Standard Oil. Only a small portion of the equipment is illustrated here. It can only indicate the extreme care and modern methods employed by Standard Oil to insure the highest quality and uniformity in the greases manufactured. And these include greases for practically every type of industrial application.



. . . scientifically designed grease kettles.

Standard Oil Lubrication Engineers will help you apply these products to give longer lasting protection to plant equipment and machines. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for a Lubrication Engineer.

Buy More War Bonds

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

Dumptors Cut Costs in Strip Mines

BACK FOR MORE—FASTER!

Because they're back for more, faster, Koehring Dumptors keep shovels working at top speed in strip mine operations everywhere. They hustle coal from loading shovels to rail-side tipples—faster than any other hauling unit. They get rid of overburden as fast as the stripping shovels scoop it up. More trips per hour mean more yards per day, lower costs all around. Lower investment, too, because it takes fewer Dumptors to handle shovel output.

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN

Accurate spotting because driver faces loading unit . . . quick getaway with 3 fast forward speeds and 3 reverse speeds that are just as fast . . . high travel speed . . . instantaneous dump at the flick of a lever.

ARMY E NAVY

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

a Tribute to King Coal . . .

AND TO AN INDUSTRY RICH IN ACHIEVEMENT

• ***Coal, abundant source of energy,*** affects the livelihood and well-being of our nation. It ultimates into munitions for our fighting forces . . . light, heat, synthetics, plastics, innumerable commodities for our civilians . . . horsepower for our transportation systems.

From the dark recesses of the past where it was the veritable whipping boy of all industries, it has joined the aristocracy of industry. In a typical miracle that is America, mines have become brightly lighted, automatic equipment replaces back-breaking human effort, and coal is now a "clean" product, washed free of dust and ash-forming refuse.

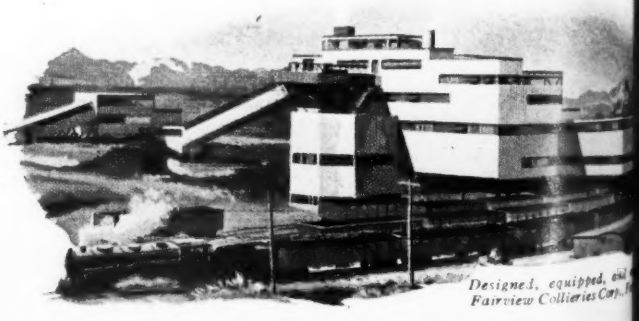
Operators look deep into human problems these days. Even in the years of depression, the industry furnished continuous employment to 500,000 men, who received the highest wages paid to any branch of American labor. They were thus able to maintain a high standard of living which was envied by coal miners the world over.

The industry looks forward to a future of gre promise. The Bituminous Coal Institut mighty co-ordinator of coal research, giv praiseworthy guidance in the development new markets.

To the great, far-seeing coal industry then, a its associates, McNally Pittsburg pays sincer tribute. To have had a part in their accom plishments is an honor. We pledge ourselv to even greater contributions to their progre in days to come.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL



Designed, equipped, and Fairview Collieries Co

McNally Pittsburg Manufacturing Corporation, Pittsburg, Kans. • Chicago 1, Illinois • Pittsburgh 19, Pa. • Caixa Postal 1310, Rio de Janeiro,

(Reproduction of Advertisement Number 7 appearing in March, 1945, Fortune Magazine)

Manufacturing Coal to meet buyer's needs is an achievement that pays

SALES departments recognize the needs and desires of their customers for coal that is clean, uniform, and closely sized. Manufacturing departments try to meet their demands, although handicapped sometimes by equipment that is just not flexible enough for the job.

To meet all demands requires equipment that is instantly adjustable to screen and re-screen, to size, wash, dry, and otherwise prepare specification coal in volume . . . coal which is destined to sell at a profit.

Each McNally Pittsburg-equipped plant is a complete and flexible manufacturing unit for the profitable production of prepared coal.

Here is a view across the wash floor in such a plant. This plant produces an average of 100 cars of washed and thermally dried coal a day. Here impurities are removed from 6" lump to ¾" x 0" and as many in-between sizes as are needed to meet customer specifications.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation, Pittsburg, Kans. • Chicago 1, Illinois • Pittsburgh 19, Pa. • Caixa Postal 1310, Rio de Janeiro, Brazil

Preformed wire rope

SAVES TIME 3 WAYS

Men in every industry are changing to Preformed wire rope because they have discovered it saves time in three important ways.

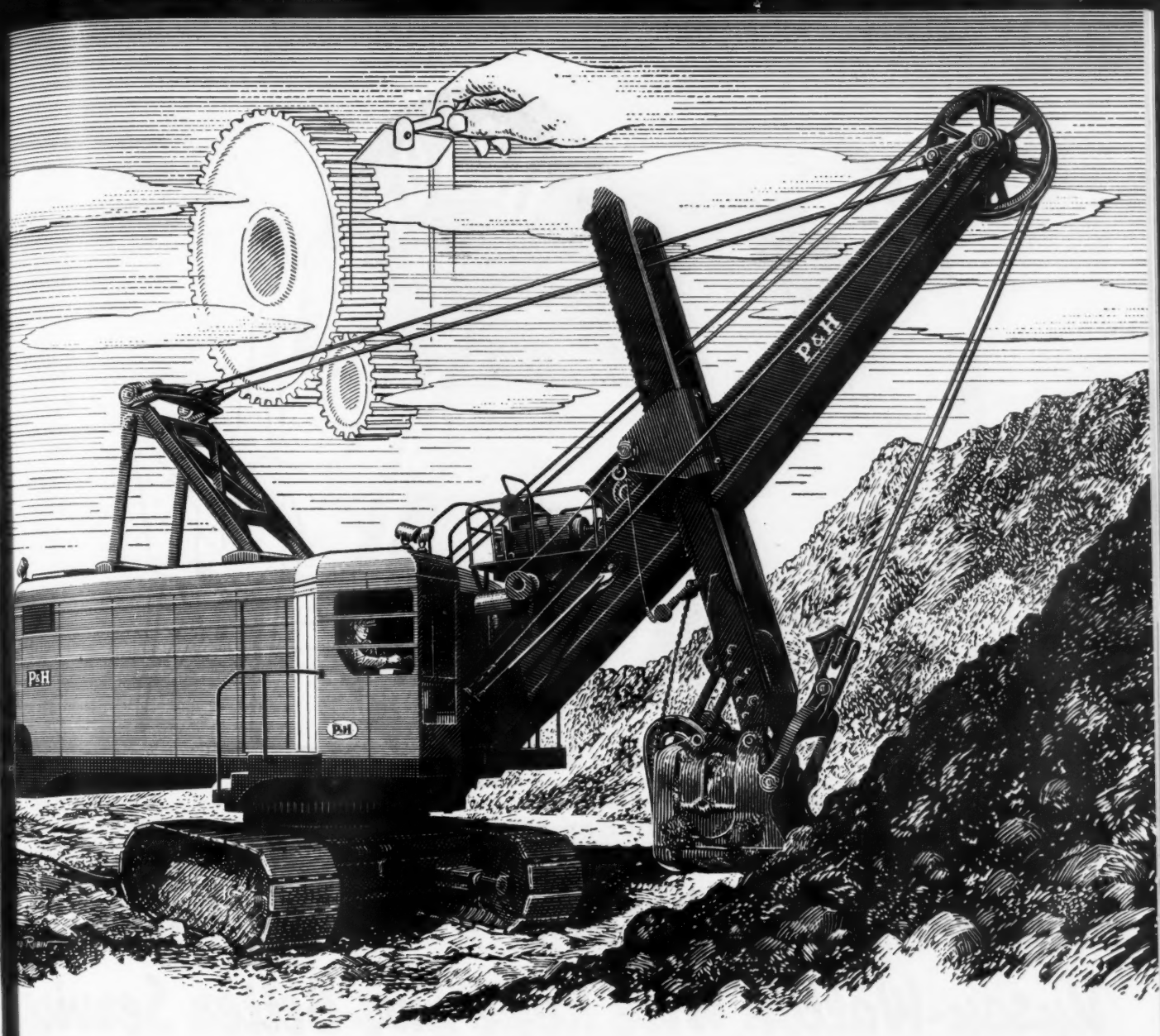
First, it cuts time of installation at least in half because it is so easy to handle, so free from kinking.

Second, Preformed saves time in operations. It is so flexible it can be spooled at higher speeds.

Third, it reduces time-out for shutdowns and replacements because it lasts longer.

These are potent reasons why men searching for new ways to save time prefer Preformed wire rope.

ASK YOUR OWN SUPPLIER FOR PREFORMED WIRE ROPE



We Switched Out The Trouble of Gear Shifting

ere is simplicity itself . . . absolute freedom from e mechanical complications of transferring power om one shovel motion to another.

Powered by its own heavy duty, shovel-type otor, the P&H propel machinery is completely inde-endent of all hoisting and swinging motions. P&H's dependent propel drive means simpler, easier ove-ups . . . it means less trouble, less time out.

The change from dig to propel is instantaneous n a P&H Electric Shovel — accomplished by a mere ck of the master propel switch. Sliding gears and echanical clutches with their complicated mechanisms are entirely eliminated — there is far more time for actual digging.

Here is another important advantage in the interests of lower tonnage costs for all kinds of open-pit operations. Behind it is P&H's 60-year leadership in applying electrical power to the movement of heavy loads.

P&H

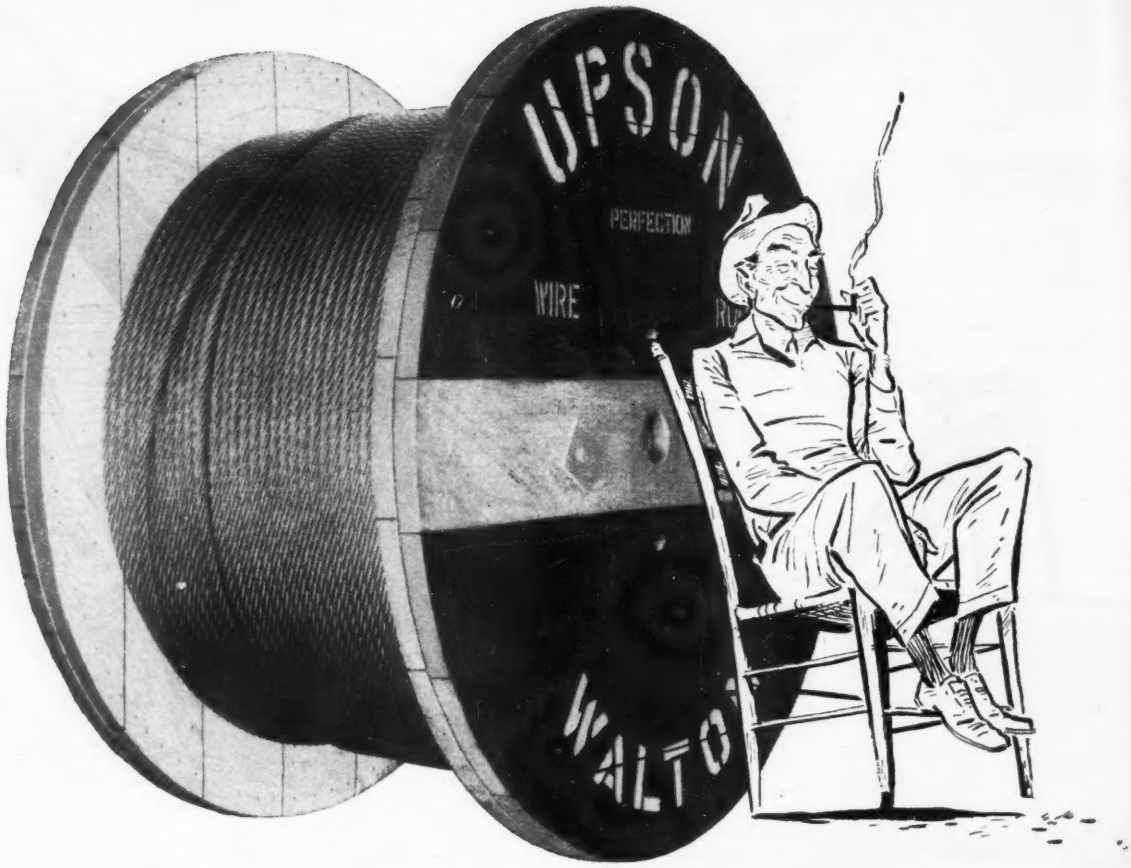
ELECTRIC SHOVELS

4540 West National Avenue
MILWAUKEE 14, WISCONSIN

HARNISCHFEGER CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

THE GREATEST FORWARD STEP EVER MADE IN ELECTRIC SHOVEL DEVELOPMENT



GOOD WIRE ROPE, LIKE GOOD TOBACCO, SHOULD BE MELLOW

Thoroughly "Mellowed" Wire makes Upson-Walton Wire Rope give Better Service

ADD a word to your buying vocabulary and you'll add dollars to the value you get in wire rope.

To the younger generation "mellow" means "perfect, wonderful, exceptionally fine". To a metallurgist talking about wire for rope, "mellow" means all that and more—a "mellow" wire has a valuable combination of physical properties that add up to better, longer lasting wire rope.

"Mellow" wire in U-W Perfection ropes has high tensile strength, it has maximum toughness and extraordinary resistance to abrasion, yet remains extremely ductile and is free from internal stresses and strains and (most important quality rope can have) has extraordinary *resistance to work fatigue.*

These are important qualities to you as a buyer. A generation of making wire rope for thousands of users has taught Upson-Walton how to specify and select wire and then fabricate it into rope which keeps all its finest qualities, all these important properties.

All wire rope may look alike when new; rope made from mellow wire keeps on "looking new" and serving the user long after other rope is worn out and gone. It pays in dollars and in longer trouble-free service to specify *Upson-Walton.*

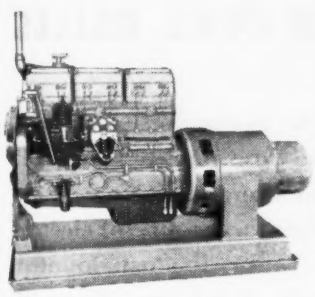
U-W
ESTABLISHED 1871

THE UPSON-WALTON COMPANY

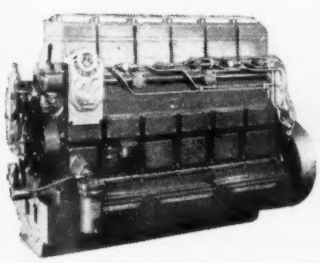
Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

NEW YORK • PITTSBURGH • CLEVELAND • BUFFALO • CHICAGO

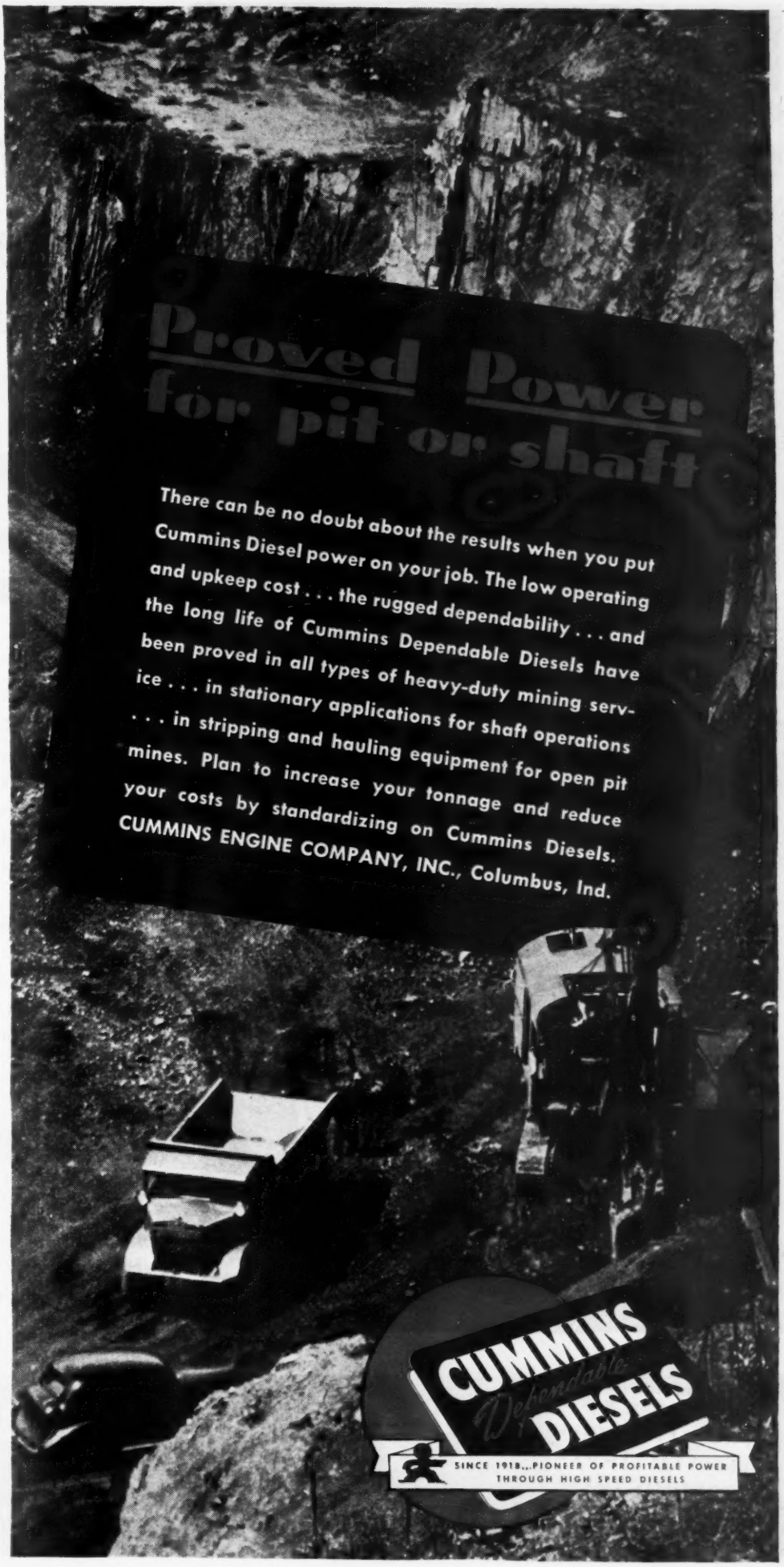
The Model **HP-600 Cummins** Diesel is one of several types of portable and stationary industrial units offered for service in the mining industry. The six-cylinder, 672 cu. in. Model H, which produces its maximum 150 hp. at 1800 rpm., was developed in 1932—is the *original* high-speed diesel . . . has been employed in a greater variety of automotive, industrial and marine applications than any other American-built diesel.



The Model H Cummins Diesel is offered in both AC and DC generating sets of 35 and 50 kw. capacity. The Cummins Diesel's quick cold-weather starting, its low operating and maintenance cost are your assurances of lower power costs and uninterrupted production.



Shown here is the Model L Cummins Diesel as offered for such portable industrial applications as shovels, draglines, cranes, locomotives, etc. This 7″ x 10″, medium speed diesel, which produces its maximum 250 hp. at 1000 rpm., is also designed for stationary service, being manufactured in several types of power units and also in 100 and 125 kw. generating sets.


Proved Power
for pit or shaft
There can be no doubt about the results when you put Cummins Diesel power on your job. The low operating and upkeep cost . . . the rugged dependability . . . and the long life of Cummins Dependable Diesels have been proved in all types of heavy-duty mining service . . . in stationary applications for shaft operations . . . in stripping and hauling equipment for open pit mines. Plan to increase your tonnage and reduce your costs by standardizing on Cummins Diesels.
CUMMINS ENGINE COMPANY, INC., Columbus, Ind.
CUMMINS
Dependable
DIESELS
SINCE 1918...PIONEER OF PROFITABLE POWER
THROUGH HIGH SPEED DIESELS

fast, low-cost drilling in every seam and formation!

CP POST-MOUNTED AND HAND-HELD COAL DRILLS

SETTING new records in speed, economy and low maintenance, CP Post-Mounted and Hand-Held Coal Drills comprise the world's largest line of electric coal drills! The four CP Post-Mounted models assure wide flexibility. To meet specific requirements complete drill assemblies can be supplied with desired combination of motor, hookup, post, clutch, boxing, thread bar, auger and cutter.

The five CP Hand-Held Electric Coal Drills include the "Whippet" — fastest, lightest and safest electric coal drill.

For full data on CP Post-Mounted Coal Drills, write for Catalog 901 — on CP Hand-Held models, write for Catalog 902, also S.P. 1995 describing CP "Whippet."

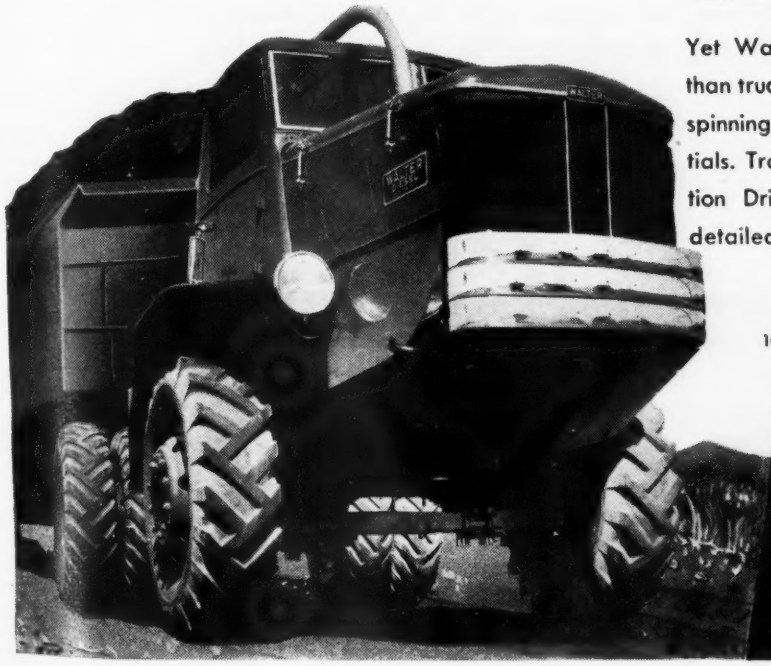
★★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

No longer need unwieldy trucks deprive mine operators of the full tonnage and low costs which huge payloads should deliver. Walter Tractor Trucks are designed expressly to get the most from enormous payloads.

Fast, their 300 H.P. Butane engines propel 60-ton payloads at normal truck speeds. Highly maneuverable, their cab forward design and short wheelbase let them "turn on a dime" in confined areas. Their hydraulic steering gives drivers virtually "finger tip" control. Rugged, they haul where others stall. The unslipping traction and full delivered power of the Walter Four Point Positive Drive enable them to haul gigantic burdens up steep grades and through loose coal and soft mud.

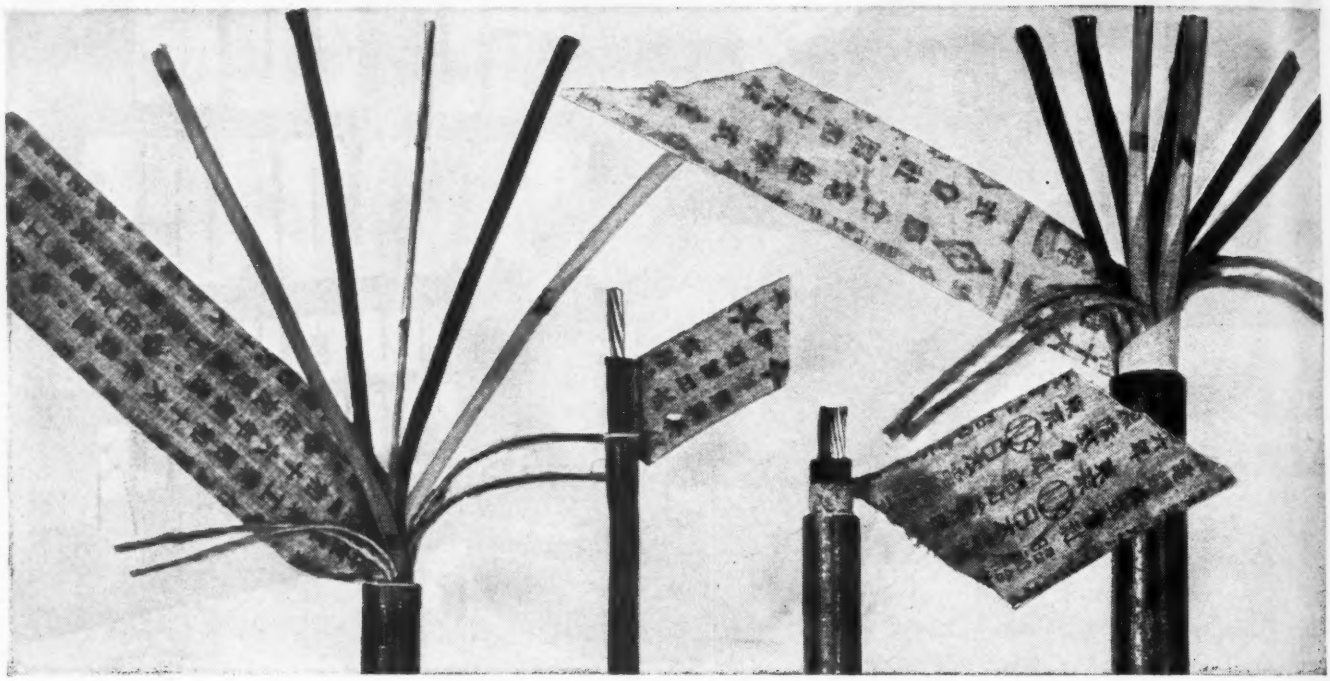


Yet Walter Tractor Trucks are easier on roads and tires than trucks with far smaller loads. Traction is smooth, wheel spinning is eliminated by three Automatic Locking Differentials. Tractor Type Transmission, Suspended Double Reduction Drive are among the other features described in detailed literature. Write for it today.

WALTER MOTOR TRUCK COMPANY
1001-19 IRVING AVENUE, RIDGEWOOD 27, QUEENS, L. I., N. Y.

WALTER
TRACTOR TRUCKS

Found:-On the Road to Tokyo ... Insulated Wires and Cables



These are not Simplex cables. They are not cables you would care to buy or use. They were picked up by one of our own men on the "road to Tokyo" and probably were "Made in Japan." They are of interest solely because they are enemy cables used by the Japanese while they occupied the Solomon Islands.

The cables in which we are more interested are the ones that you will need to carry out your postwar plans. Specially designed cables will be your best buy wherever you have unusual installation hazards or operating conditions. In writing specifications for such cables our long experience can be of help to you.

If you are looking for economical, efficient cable performance for communication, remote control or power transmission, you can get it with a Simplex cable engineered to fit your job.

Simplex Wire & Cable Co., 79 Sidney Street, Cambridge 39, Mass.

ARMY E NAVY M★★★

Simplex WIRES and CABLES

PROGRESS
THROUGHOUT THE YEARS!

1884 1906 1923 1945

MARION ACHIEVEMENTS THROUGH THE YEARS WILL BRING YOU THE SHOVEL OF TOMORROW

★ MARION'S contributions to power shovel design and performance have been outstanding for over 60 years.

MARION has anticipated industry's needs by building machines of ever greater speed — capacity — and range.

NOW — TODAY — there is a MARION of the correct size and type to master every material handling problem and digging condition.

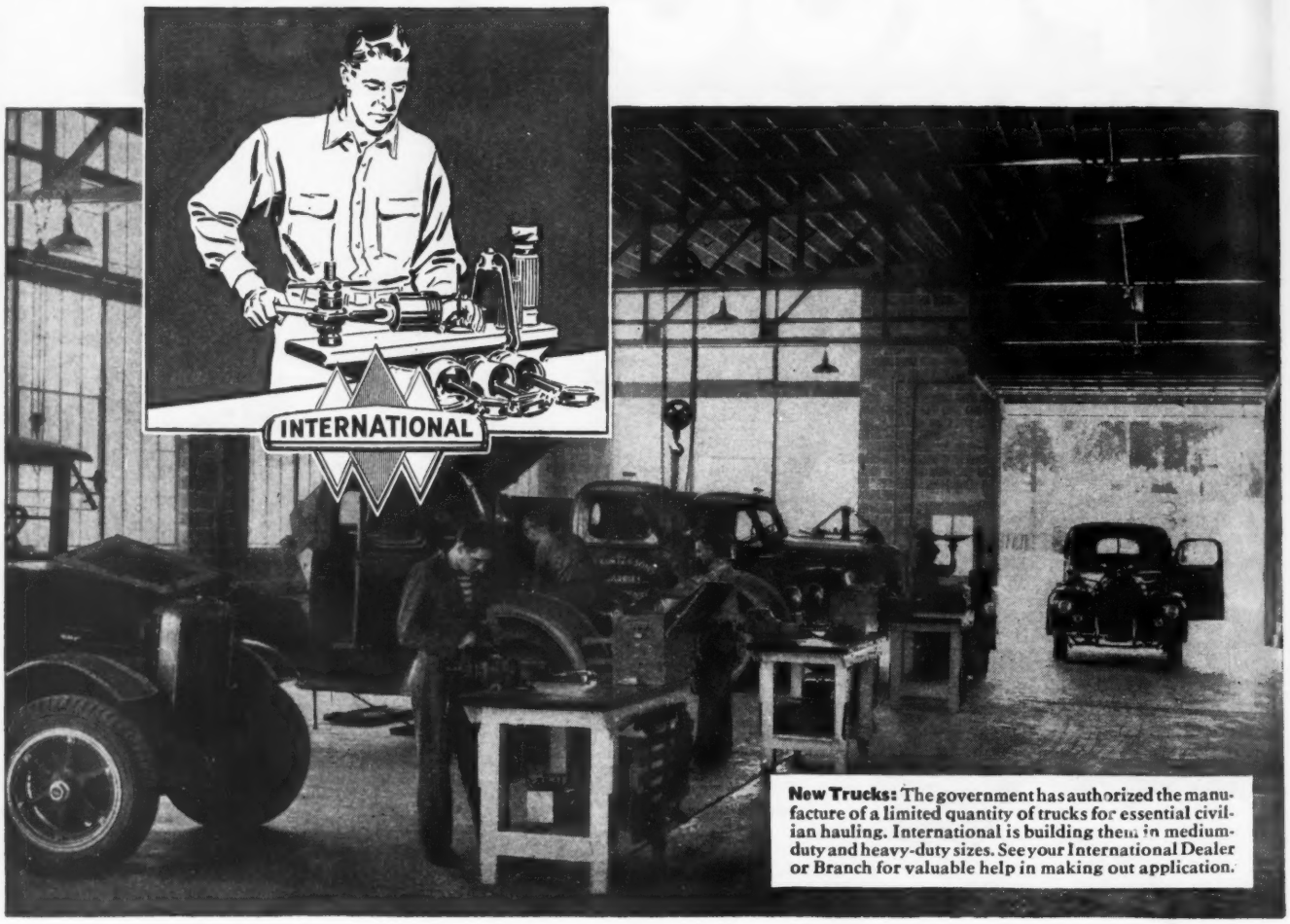
What is your problem? Let's discuss it.

THE MARION
STEAM SHOVEL COMPANY • MARION, OHIO

SHOVELS • DRAGLINES • CRANES
CLAMSHELLS • PULL-SHOVELS • WALKERS
From 3/4 cu. yd. to 35 cu. yds.

TRUCK SERVICE MEN

who know what's expected of them–


INTERNATIONAL
New Trucks: The government has authorized the manufacture of a limited quantity of trucks for essential civilian hauling. International is building them in medium-duty and heavy-duty sizes. See your International Dealer or Branch for valuable help in making out application.

What's most important about truck service today?

Isn't it this: That the men who provide the service know what's expected of them . . . know that somehow they've got to keep overage trucks at work, hauling the million-and-one things a victory-bound nation needs?

Every day these men fix old trucks long overdue at the scrap heap—trucks that almost say, "I defy you to keep me hauling at a reasonable operating cost." The service men don't scare. Their attitude seems to be: "You can't bluff me, old timer, I'll keep you humping." And they do.

The service men at International Truck Branches, the nation's largest company-owned truck-service organization, and the service men who work for more than 5,000 International Truck Dealers aren't supermen. Sure, they have top tools, equipment and experience, and genuine International Parts. But they also know what's expected of them—know that unless they keep old trucks rolling, some of the things a victory-bound nation needs won't get there.

These men get no honors. They simply do what is needful—keep overage trucks at work when we'd all suffer seriously if the old trucks failed to perform.

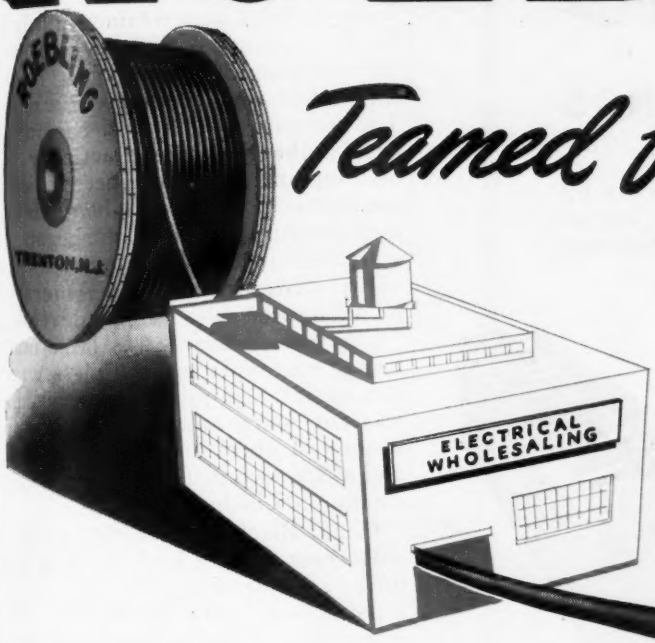
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue
Chicago 1, Illinois

HARVESTER

INTERNATIONAL *Trucks*

ROEBLING

Teamed for your Profit!



1. The finest in electrical wires and cables from ROEBLING

2. The best in service from ROEBLING ELECTRICAL WHOLESALERS

EVER STOP TO THINK that the best products in the world aren't very helpful unless you get them when and where you want them? And at the right price?

Thank your electrical wholesaler for that part of a job well done . . . even under the strain of total war, with increased demands and limited supplies.

That's why Roebling will continue to team up with electrical wholesalers now and always. We'll do our part of the job with a complete line of wire and cable that embodies every modern development and assures the best possible service. Roebling wholesalers will see that you get them, and hundreds of other fine electrical products too.

Roebling and your local wholesaler . . . it's a team that you can't beat when you want the best products and service. Teamed for *your* profit!

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities
Roebling Wholesalers in Strategic Localities

JR ROEBLING

ROEBLING ELECTRICAL WIRES AND CABLES

WEATHERPROOF WIRE • RUBBER COVERED WIRES AND CABLES • SERVICE ENTRANCE CABLES (INCLUDING THIN-WALL INSULATED BUILDING WIRES AND CABLES) • RUBBER INSULATED POWER CABLES • TROLLEY CONTACT WIRE RUBBER SHEATHED PORTABLE CABLES • VARNISHED CAMBRIC POWER CABLES BARE COPPER STRAND • PIGTAIL AND BRAIDED COPPER • MAGNET WIRE TELEPHONE WIRES

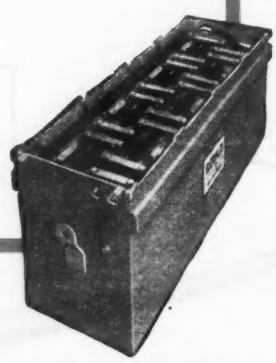
PACEMAKER IN WIRE PRODUCTS

ENERGY RATINGS ARE VITAL

Man's energy rating is determined by the basal metabolism test for energy output. A man cannot do efficient work beyond his energy rating.

IN A MINE LOCOMOTIVE BATTERY

energy ratings are equally vital.



GLASSKLAD *since 1925*

There are many factors to consider in the selection of a storage battery. Energy demands are of prime importance but equally so is the life expectancy of the battery.

No matter what your storage battery requirement may be, Gould is in a position to offer you the benefit of its half century of experience in designing, developing, and building storage batteries. There is a Gould Battery for your individual need.

Write Dept. 92 for Gould Kathanode Glassklad Battery Catalogs: 200 for Mine Locomotive Service, and 300 for Mine Shuttle Car Service.

GOULD

Since 1898 THE BATTERY PICKED BY ENGINEERS

For Excellence in storage battery production at Depew plant

GOULD STORAGE BATTERY CORPORATION, Depew, New York. Factories: Atlanta • Chicago • Dallas • Depew • Los Angeles • North Bergen • Rock Island • St. Paul • Sioux City • Zanesville

THE KATHANODE POSITIVE UNIT

One of a series of informative articles for users of industrial batteries.

In 1925 Gould bought the license rights from the D. P. Battery Company of London to manufacture batteries with the glass retainer principle. D. P.'s original patent covered only the wrapping of glass wool, as it was then called, around the positive plate. The pressure of the wood separators against the glass was practically the only support. Gould engineers quickly foresaw the possibilities inherent in the fundamental principle and began research seeking further improvements.

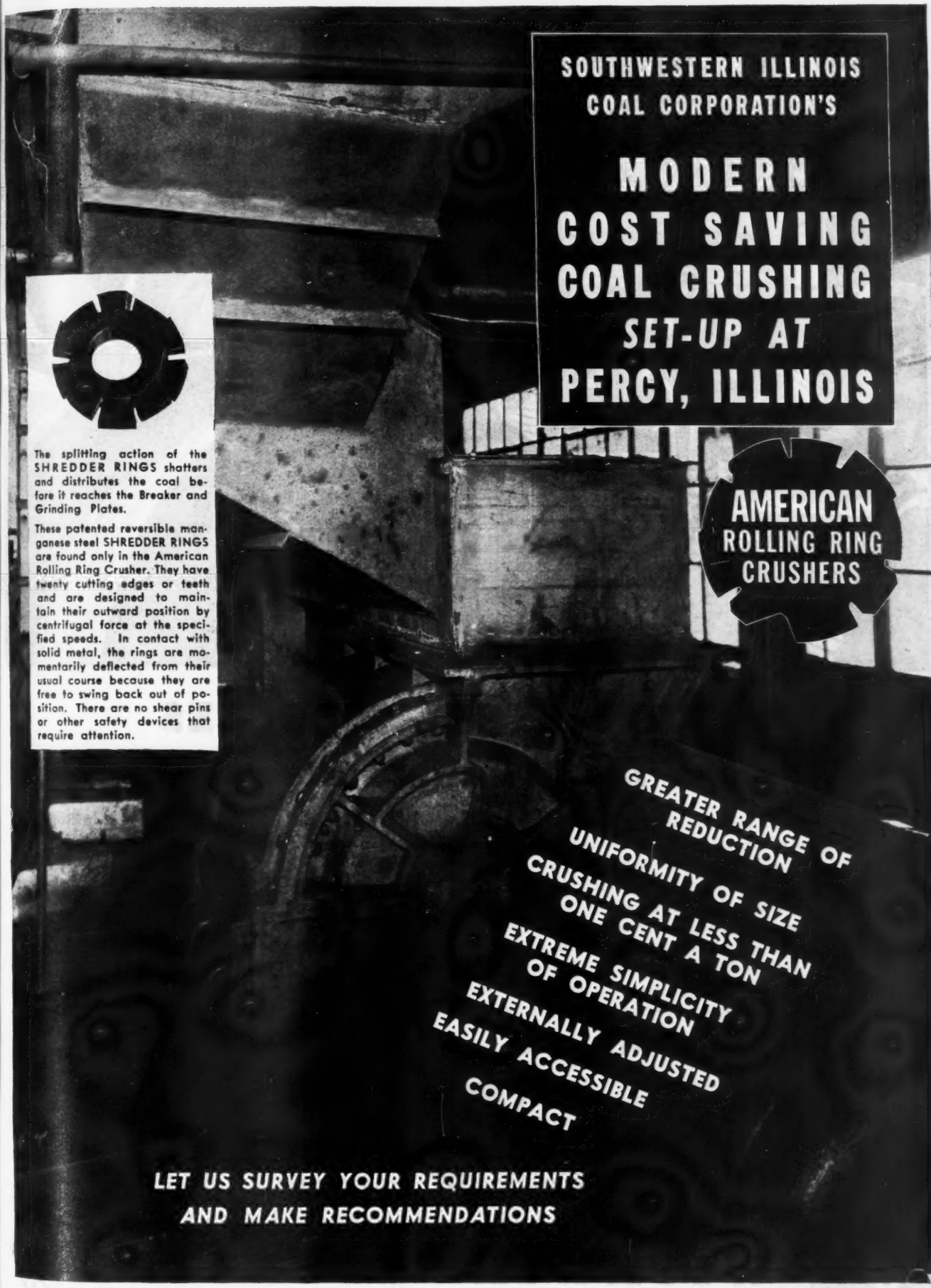
First Gould found an American manufacturer who helped develop a "spun glass," which was later made into a mat replacing the glass wrap-around retainer principle. Each mat was cut sharp and clean to prevent fraying of fibers and possible treeing and was made up of 12 stratified layers totaling .05 inches.

Gould Black Oxide active material with cores of pure lead giving it long life and great power producing characteristics was next developed. This required an equally long-lived separator so research was started on a rubber separator, which was perfected and named Durapor. In keeping with these improvements the positive grid was redesigned to give equal life. It was made up of wedge-shaped boxes with round members imbedded in the active material, a feature exclusive with Gould.

Gould engineers next developed a porous rubber sheet to wrap around the positive plate to provide a Unit-Seal Envelope to successfully hold the glass retainer mats in place. It is open at both the top and bottom to permit spent material to filter to the sediment chamber and is 60% porous for rapid electrolyte diffusion.

Briefly summarizing, the well-known "Gould Kathanode Positive Unit" consists of the sturdy antimonial lead grid; then the "high powered" Gould Black Oxide active material; next a spun glass mat on each side of the plate; and surrounding the plate the Gould Unit-Seal Envelope holding the entire assembly into the complete Kathanode Positive Unit.

Because of this construction Gould Kathanode Batteries give reliable performance and long life—essential characteristics for today's demands in modern accelerated industry.


SOUTHWESTERN ILLINOIS
COAL CORPORATION'S
MODERN
COST SAVING
COAL CRUSHING
SET-UP AT
PERCY, ILLINOIS
AMERICAN
ROLLING RING
CRUSHERS
The splitting action of the SHREDDER RINGS shatters and distributes the coal before it reaches the Breaker and Grinding Plates.
These patented reversible manganese steel SHREDDER RINGS are found only in the American Rolling Ring Crusher. They have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at the specified speeds. In contact with solid metal, the rings are momentarily deflected from their usual course because they are free to swing back out of position. There are no shear pins or other safety devices that require attention.
GREATER RANGE OF REDUCTION
UNIFORMITY OF SIZE
CRUSHING AT LESS THAN ONE CENT A TON
EXTREME SIMPLICITY OF OPERATION
EXTERNALLY ADJUSTED
EASILY ACCESSIBLE
COMPACT
LET US SURVEY YOUR REQUIREMENTS
AND MAKE RECOMMENDATIONS

AMERICAN PULVERIZER COMPANY 1119 MACKLIND AVENUE ST. LOUIS, 10, MISSOURI

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

STOUT STEEL MUSCLES
for the Merchant Marine

The rigging for a typical cargo ship requires over 11,000 feet of wire rope, ranging in size from ¼ inch to 2¼ inches, and weighing over 10 tons. Scores of shipyards are building such ships—and using plenty of tough, dependable Wickwire Rope.

Oil fields, mines, logging camps, construction crews—and our fighting men abroad—also depend upon the stout steel muscles of Wickwire Wire Rope to do their heavy hoisting and hauling jobs. That's why—even with more equipment and working at full capacity 24 hours a day—we cannot keep up with the great demands for Wickwire Rope.

Since wire rope is harder to get, each length must be made to last longer. WISSCOLAY *Pre*formed Wire Rope, manufactured by Wickwire Spencer, not only lasts longer, but it's kink-resistant—easier to cut, splice and install—safer to handle.

If you have a wire rope problem our wire rope engineers will be happy to be of service. Call or write our nearest branch office or Wickwire Spencer Steel Company, 500 Fifth Avenue, New York 18, N. Y.

VALUABLE GUIDE FOR ALL ROPE USERS

Thousands of copies of "Know Your Ropes" have been sent to men in industry and the Services. Packed with ideas for making wire rope last longer this 82 page book contains 48 wire rope life-savers; 78 "right and wrong" illustrations, and 20 diagrams, tables, graphs, charts.

SEND FOR YOUR FREE COPY

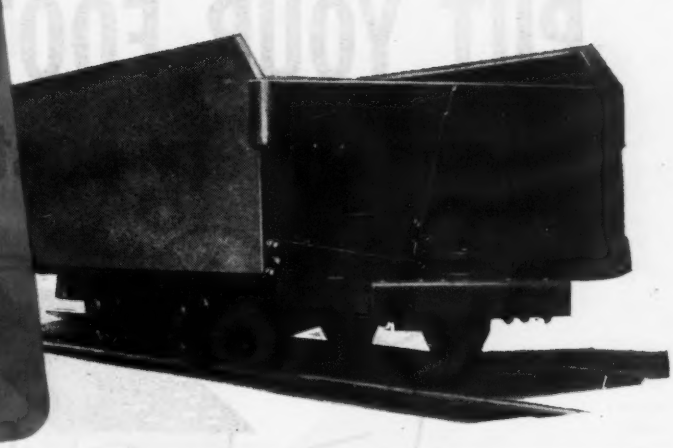
Send your wire rope questions to:

WICKWIRE SPENCER STEEL COMPANY

500 FIFTH AVENUE, NEW YORK 18, N. Y.

Abilene · Buffalo · Chattanooga · Chicago · Detroit · Houston · Los Angeles · Philadelphia · San Francisco · Tulsa · Worcester

If you want more
STRENGTH
without more weight

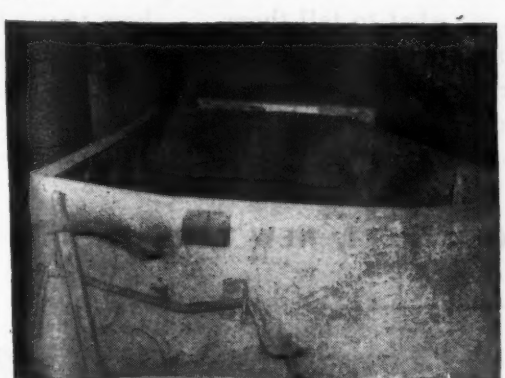


MILD STEEL CAR

41-ton roof fall proves COR-TEN's extra strength — This is what happened when a solid chunk of slate, 2 feet thick, 8 feet wide and 57 feet long, crashed on top of two cars of identical design—one of COR-TEN and one of mild steel.

The mild steel car did not fail but one side was buckled a full 8 inches out of line. The other side, and one end too, were badly bent. This car had to be removed from service and extensive repairs were necessary.

In contrast, the COR-TEN car was only slightly bowed on one side and one end. Except for a broken coupler it was perfectly usable and could be put into service without further repairs.



U.S.S. CORTEN CAR

... build with COR·TEN

YOU don't have to build your mine cars heavier to build them stronger.

COR-TEN's high strength—1½ times that of open hearth structural steel—its greater resistance to abrasion, its 80% greater resistance to fatigue plus its ability to better withstand shock and impact have set new standards of ruggedness and stamina in mine car construction.

In addition, COR-TEN—with a resistance to atmospheric corrosion 4 to 6 times that of plain steel—has demonstrated its ability to withstand the corrosive conditions generally encountered in mine car service better than plain open hearth or copper steel.

For these reasons, COR-TEN, when used in the same thickness *and same weight* as plain steel construction, will give mine cars not only much greater strength and toughness but provides maximum resistance to destructive forces.

These are facts demonstrated daily by more than 10,000 hard working COR-TEN mine cars now in service under every kind of mine condition.

Today, COR-TEN is just as available as ordinary steel. Our engineers will gladly go into the economics of its application.

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*

United States Steel Supply Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York

USS STEEL
UNITED STATES STEEL

UNITED STATES STEEL

PUT YOUR FOOT IN THE DOOR

of every post-war house!

Plan now to protect your post-war coal business . . . Tie in with the coast-to-coast campaign for Adequate Chimneys

● Are you waiting for trouble to come your way? Or are you making post-war plans now?

After the war, thousands of new homes will be built. Unless you do something about them, there's a great danger that most will be built with chimneys *too small* for Bituminous Coal heating.

Skimpy chimneys create a two-way danger. They threaten your post-war coal sales. And they endanger the long-range value of post-war homes . . . built to last at least 30 years. If those houses are built to use only other-than-coal fuels, how long will these other fuels be available at a reasonable price? Because Bituminous Coal is the most plentiful of all fuels and will be the lowest-cost fuel for ages . . . *no new home should be built without a chimney big enough to burn Bituminous Coal.*

Already a national campaign, sponsored by the Bituminous Coal Institute, is warning home-builders and architects to erect post-war houses with Adequate Chimneys. Advertisements in the popular home-makers' magazines and in the leading architectural journals are urging that all houses be built so that they can burn Bituminous Coal *or can be converted to it* . . . without tearing the house down!

Here's How You Put Your Foot In the Door!

By tying in locally with this national campaign, you can add to your own business prestige, you perform a genuine community service, and you protect your own future coal sales.

Ask us for the eight major ways to campaign for Adequate Chimneys. We'll explain who to contact . . . what to tell them . . . how to win their support. We'll also send you a sample of printed material which can be extra helpful in waging your campaign. Today, sign the coupon below . . . and prepare properly for post-war days!

BITUMINOUS COAL INSTITUTE, 60 EAST 42ND STREET, NEW YORK 17, N. Y.

CLIP THIS COUPON

Bituminous Coal Institute,
Department J
60 East 42nd Street,
New York 17, N. Y.

I am interested in protecting future Bituminous Coal sales in my community. Please send me complete information, including a sample consumer folder. This obligates me in no way.

Name_____

Company_____

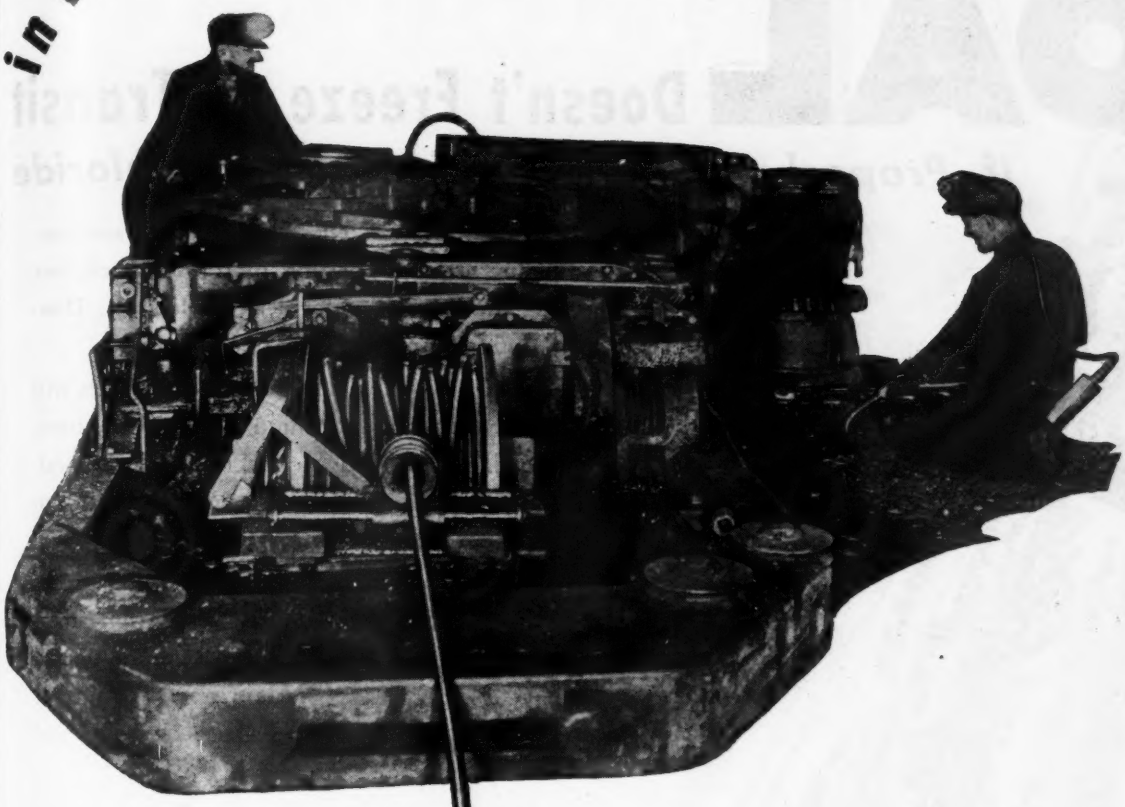
Address_____

City_____ State_____

MAIL IT TODAY!

(NOTE: This advertisement is one of a series appearing in coal dealer publications. If you would like more information about this campaign, write to the above address.)

in reeling and unreeling . . . REELING and UNREELING . . .



HAZACORD Flexibility AND Ruggedness COUNT

There's little rest on the job for electric reel cable. Coiled on the reel, stretched out straight then reeled again, its life is one of constant change of shape, position and stress.

Hazacord Reel Cable provides internal flexibility by the use of many fine wire strands of tinned copper. Standard stranding is 133 wires (7 strands of 19 wires each) for sizes 8 to 2AWG. For No. 1 and larger, 259 wires are cabled together (7 strands of 37 wires each). Other strandings may be had if desired.

Insulation of extreme flexibility made of Buna S synthetic rubber compound of high dielectric strength is encased in an open mesh twine reinforcement.

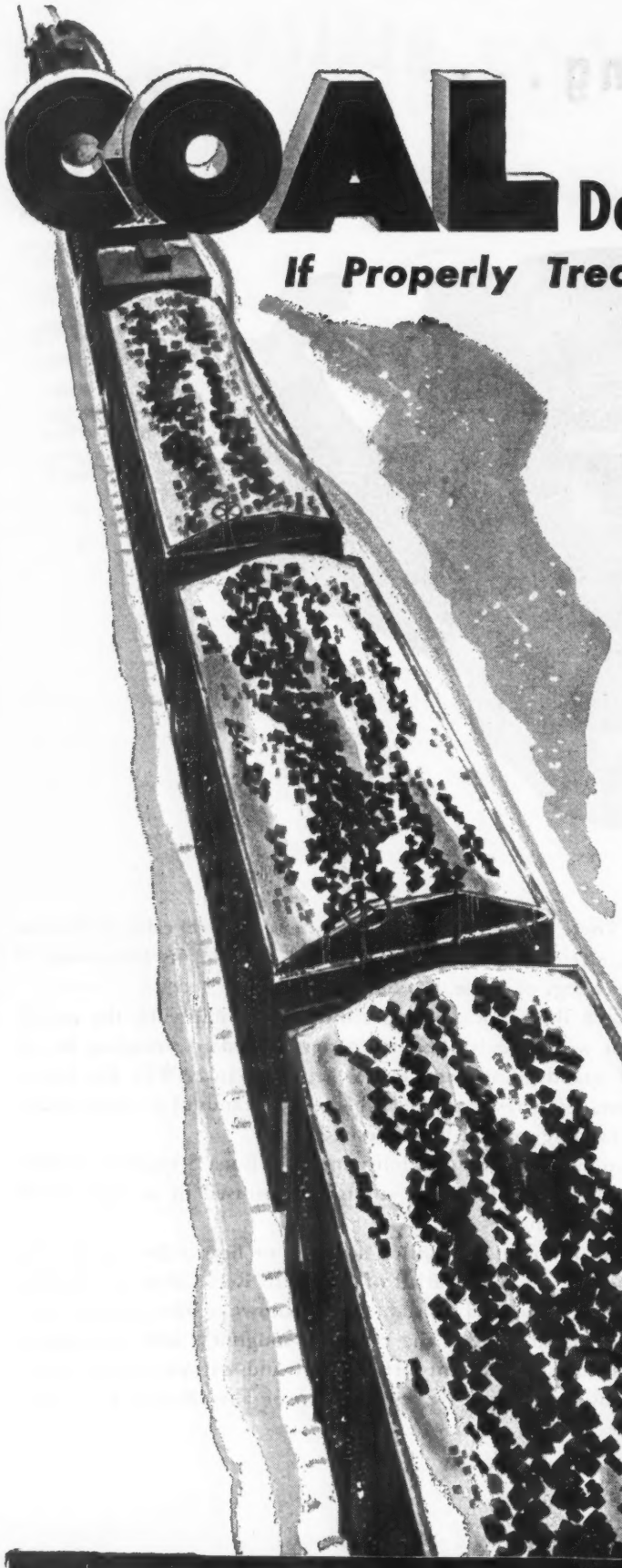
Constant rubbing and pulling across mine floor rubble makes the ruggedness of the outer jacket of Hazacord Reel Cables invaluable. This tough oil and acid resistant sheath known as Hazaprene is vulcanized in metal molds. The resulting toughness and smoothness insures an abrasive-resistant surface which adds extra life to the cable. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD

insulated wires and cables for every mining use

COAL Doesn't Freeze in Transit

If Properly Treated with Calcium Chloride



Mine companies tell us they don't have complaints of coal freezing in transit when they use the calcium chloride, double duty, Dustproofing-Freezeproofing treatment.

Time is coming when competitive fuels will make coal dealers hump to hold business. Proper dustproofing with clean, odorless calcium chloride is one of the best ways to develop customer good will.

And when you dustproof coal at the mines with calcium chloride you also prevent freezing—a double service which dealers need and have a right to expect right now when labor shortages and high wages make frozen coal an expensive nuisance.

Our Bulletin No. 37 will tell how to use this double duty treatment. Let us send you a copy — NOW.

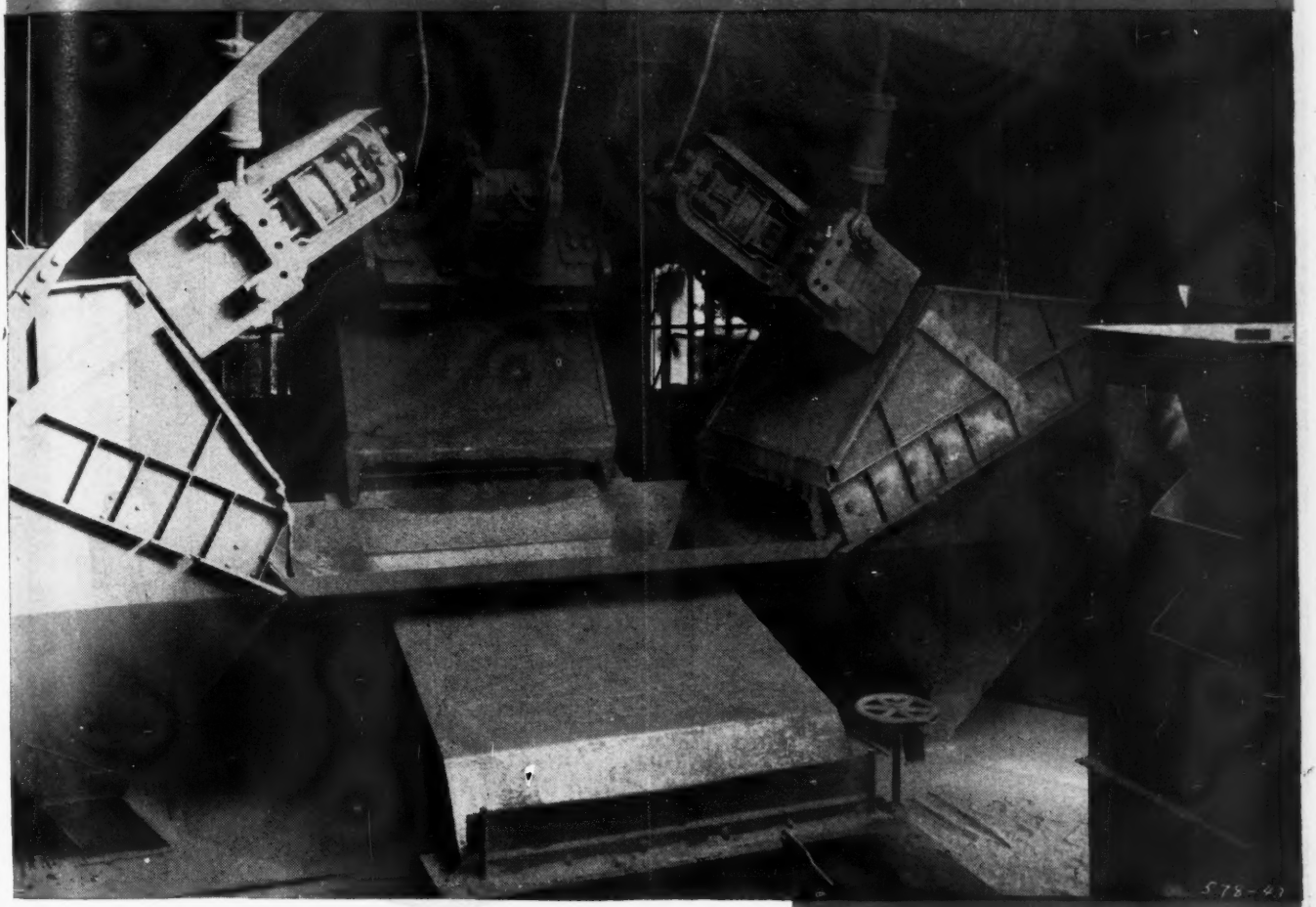
CALCIUM CHLORIDE ASSOCIATION

4145 Penobscot Building **Detroit 26, Michigan**

FREEZEPROOF COAL AT THE MINES WITH

CALCIUM CHLORIDE

JEFFREY *Preparation* EQUIPMENT



● Illustrated are three 4 x 7 Heller Type Wire Traylor screens handling 300 tons per hour of 3 x 0 coal from shaking screens and by-passing the fines in front of two compartment right-hand Diaphragm Jig.

For your sizing, scalping, by-passing, re-screening, dedusting or washing investigate the many advantages offered in Jeffrey-Traylor equipment.

Jeffrey Engineers will be glad to assist you in determining the proper units for your conditions. Catalog 750 also contains useful information on all types of Jeffrey-Traylor equipment. *Write for it.*

JEFFREY-TRAYLOR DIVISION

JEFFREY-TRAYLOR SCREENS

for better, faster coal sizing

THE JEFFREY MANUFACTURING COMPANY

(ESTABLISHED IN 1877)

912-99 NORTH FOURTH STREET • • COLUMBUS 16, OHIO

SALES OFFICES: Baltimore 1, Birmingham 3, Boston 16, Buffalo 2, Chicago 1, Cincinnati 2, Cleveland 13, Denver 2, Detroit 13, Harlan, Houston 5, Huntington 19, Milwaukee 11, New York 7, Philadelphia 3, Pittsburgh 22, St. Louis 3, Salt Lake City 1, Scranton 3

Type KSC Sectionalizing Circuit Breaker recloses automatically when line is cleared.

One of the principal reasons why d-c power sectionalizing is recognized as good practice is because of the great amount of time saved throughout the mine.

For example, when a "short" or overload is confined to a small section, there is a substantial saving in labor and in the operating time of machines in nearby sections which are not affected.

Not only are mining, loading and transportation equipment kept in more nearly continuous operation but, being better protected electrically, there is less time required for maintenance, replacement or repair.

In these days of peak production needs a saving in operating time means more coal mined per day. Records show that a 10 percent increase in production is not unusual following sectionalizing of a d-c power system.

Write today for I-T-E Bulletin 2502 which contains full details on Automatic Reclosing Circuit Breakers and their applications in the mining field. I-T-E Circuit Breaker Co., 19th and Hamilton Streets, Philadelphia 30, Penna.

I-T-E

Representatives in Principal Mining Areas

ARMY E NAVY

AIR SWITCHGEAR

INCREASE YOUR YARDAGE with Firestone TIRES

AS A CONTRACTOR you are ever searching for ways and means to increase your yardage . . . to work more hours per season with less time out for repairs . . . to lower your maintenance costs . . . *to increase your profits.* Today your answer lies in power-driven equipment mounted on Firestone tires.

These big, tough, rugged tires make the operation of modern earthmoving equipment more profitable. Firestone, the pioneer builder, has the advantage of more extensive research and actual field service to build a tire to do your job better. Their strength and quality keep them on the job longer. That is why, with Firestone tires on your equipment, you can move earth at the lowest cost.

Listen to the Voice of Firestone with Richard Crooks and the Firestone Symphony Orchestra, under the direction of Howard Barlow, Monday evenings, over N.B.C.

Copyright, 1945, The Firestone Tire & Rubber Co.

FIRESTONE OFF-THE-HIGHWAY TIRES

HOT STUFF

Torture is a mild word to describe what our research engineers do to U. S. Royal Safety-Tested Cords and Cables. After submitting them to tests of impact, compression, stretch and bend . . . after exposing them to sub-zero cold, U. S. Royal Cords and Cables are subjected to an "ordeal by heat" far more severe than any they will ever meet in service.

THE NEW U.S. ROYAL *Safety Tested*

MINING MACHINE AND LOCOMOTIVE CABLES

Listen to "Science Looks Forward" — new series of talks by the great scientists of America — on the Philharmonic-Symphony program: CBS Network, Sunday afternoon 3:00 to 4:30, E. W. T.

UNITED STATES RUBBER COMPANY

SERVING THROUGH SCIENCE

1230 SIXTH AVENUE • ROCKEFELLER CENTER • NEW YORK 20, N. Y.
In Canada: DOMINION RUBBER CO., LTD.

What to do about Rust?

Make this Test

Immerse any rusty nail in a small quantity of Cities Service Rust Remover. If badly rusted, allow to remain for several minutes. You can actually see the rust dissolve.

See the Results

Remove nail and wipe dry with cloth or tissue. Note the complete absence of rust and the way the original surface reappears.

CITIES SERVICE RUST REMOVER has been tested for four years throughout a small, highly industrialized area in the East, where it has earned a unique reputation for performance. RUST REMOVER is a clean, clear liquid, practically odorless, non-inflammable, easily applied, and harmless to handle by those not allergic to specific chemicals. It is fast-acting, and, although heating somewhat accelerates results, general application is recommended at normal temperature (60°-90°F.). RUST REMOVER is effective on chromium, copper, aluminum, steel and iron.

5 Big Advantages

1. Non-Inflammable
2. Harmless to Normal Skin
3. Makes Metals Chemically Clean
4. Removes Rust by Chemical Action
5. Free from Muriatic, Sulphuric, Nitric and Oxalic Acids or Cyanide.

See a Free Demonstration of Rust Remover on Your Own Equipment.

(Available only in Cities Service marketing territory EAST of the Rockies.)

MAIL THIS COUPON TODAY!

CITIES SERVICE OIL COMPANY
Room 200
Sixty Wall Tower, New York 5, New York

Gentlemen: I'd like to test RUST REMOVER on my own equipment FREE OF CHARGE. Send me details.

Name.....

Company.....

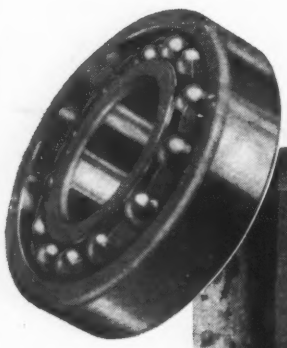
Address.....

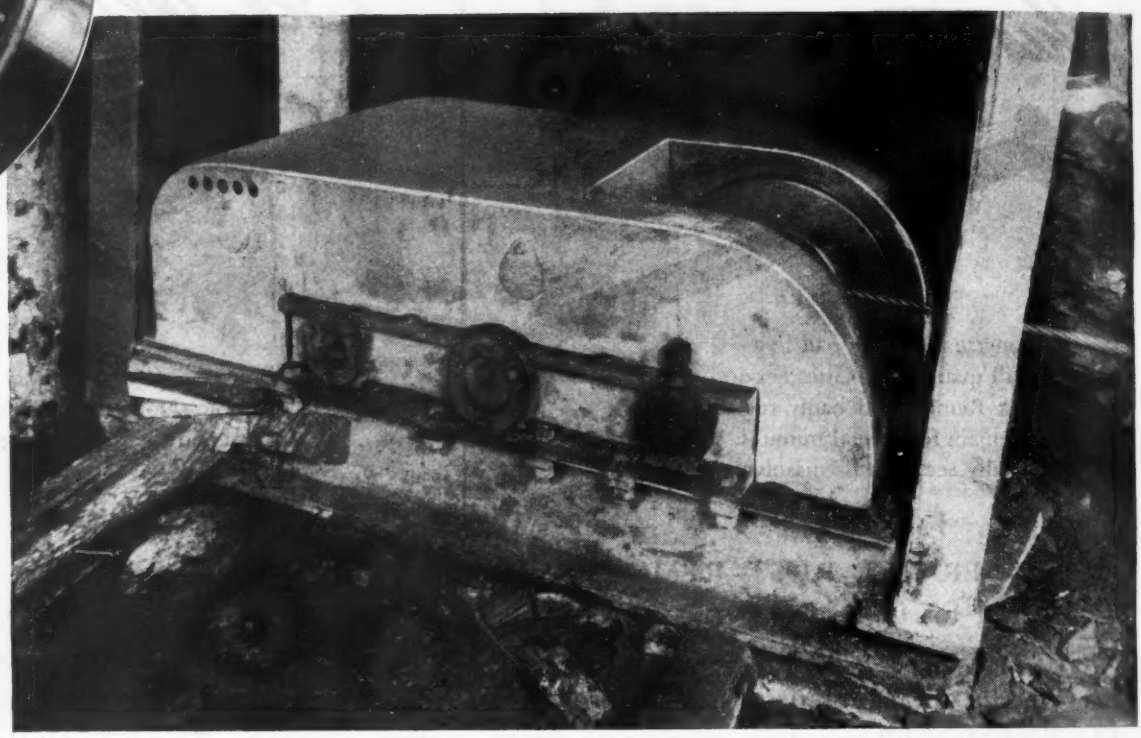
City.....State.....

CITIES SERVICE OIL COMPANY
NEW YORK · CHICAGO

IN THE SOUTH
ARKANSAS FUEL OIL COMPANY
SHREVEPORT, LA.

PULLING 6000 LBS. AT 25 F.P.M.!

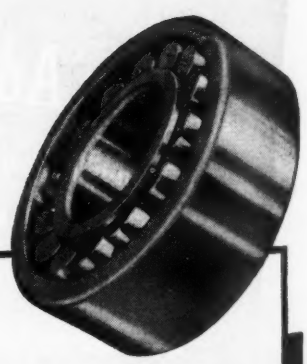




Built by VULCAN IRON WORKS

There's plenty of pull in this SKF-equipped 5 h.p. Car Spotting Hoist. It helps spot a trip of cars at the discharge end of the conveyor and hoists or lowers the trip past the discharge point at a time and at a speed conducive to uniform and continuous loading. SKF Bearings are on the pedestals where they easily take the loads imposed by a rope pull of 6000 pounds at 25 feet per minute . . . where they carry the weight of the drum with its 600 feet of 5/8" rope. What makes them ideal bearings for this application is their high capacity . . . their inherent aligning properties that compensate for shaft deflections, distortions or weave. The way to increase production on any machine is to trust its vital rotating parts to SKF's. 5738

SKF INDUSTRIES, INC., PHILADELPHIA 34, PA.



Pioneering in practically all industries, SKF produces ball and roller bearings of all types and sizes, from ¾" to 59" O.D.

SKF PUTS THE RIGHT BEARING IN THE RIGHT PLACE

SKF

BALL AND ROLLER BEARINGS

ASK MINE OPERATORS

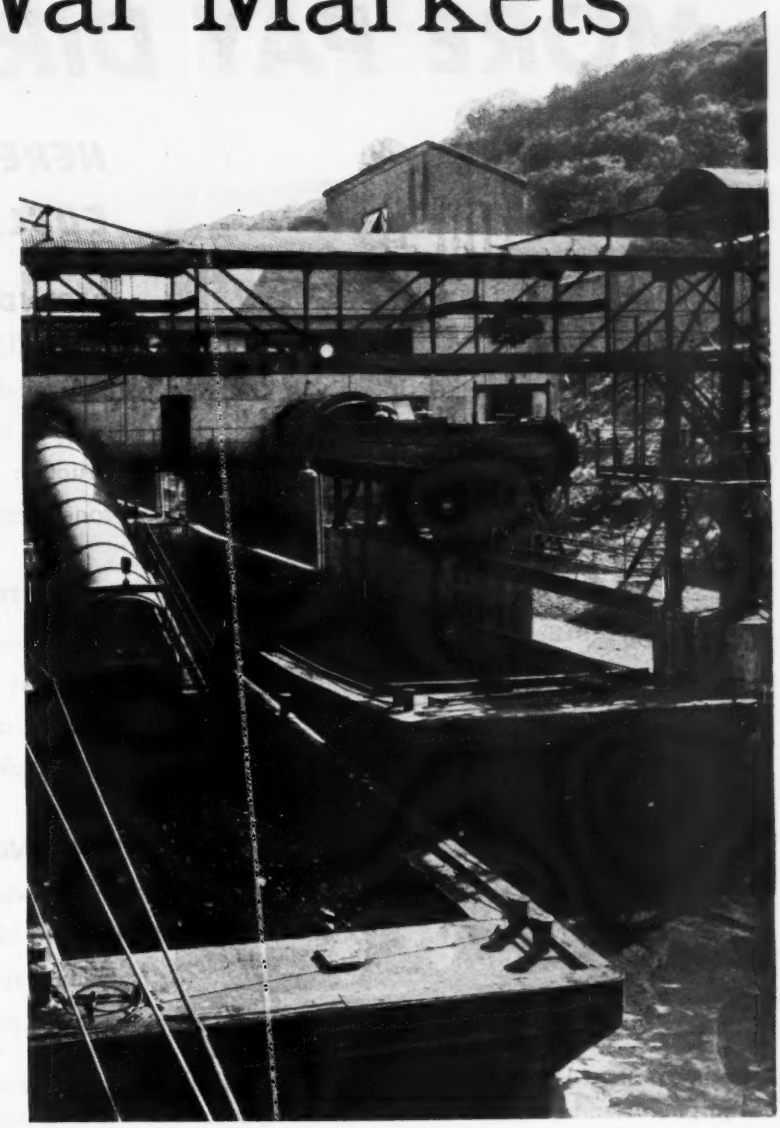
ASK LABOR ORGANIZATIONS

ASK GOVERNMENT OFFICIALS

and they will tell you...

Mines must Mechanize to Win Post-War Markets

BETTER COAL PREPARATION* is a post-war *must*—because *in a buyers' market* clean coals, of low impurity content, correct sizing and high uniformity will have *all the selling advantage!*



Morrow Tipples Improve Quality, Raise Product Value— Cut Operating Costs

About ⅓ of the mines in this country are mechanized. Of that ⅓ a very high percentage are Morrow equipped. That's because Morrow *streamlines production of coal* from the mine, through most modern, efficient preparation equipment, to cars and barges in shorter time, at lower operating costs—*in the best condition to SELL!*

Morrow engineers are available *now* to design and equip more efficient preparation plants for post-war operations. Ask Morrow to assign an engineer to study your situation. Write The Morrow Manufacturing Company, 1940 Ford Boulevard, Wellston, Ohio. *Division The Wacker Corporation.*

* Better Preparation
= *INCREASED SALES!*

1. low impurity content
2. correct sizing
3. high uniformity

MECHANIZE WITH MORROW

COAL WASHERS • WEIGH PANS • FEEDERS • DUMPS
BINS AND BIN GATES • FLANGED LIP SCREENS
CONVEYORS • LOADING BOOMS • SHAKING SCREENS
VIBRATING SCREENS • CAR HAULS • PICKING TABLES
SETTLING TANKS • ELEVATORS • CAR RETARDERS
PERFORATED METAL SCREENS • STEEL STRUCTURES

"Made to Order" for MORE PAY DIRT PER DAY

HERE ARE THREE REASONS WHY EUCLIDS CUT HAULING COSTS

DEPENDABILITY . . . Both Rear-Dump and Bottom-Dump EUCLIDS are built from the bottom up for heavy duty off-the-highway service. Continuous performance records on hundreds of the toughest mining and construction jobs are evidence of superior design, rugged construction and painstaking production.

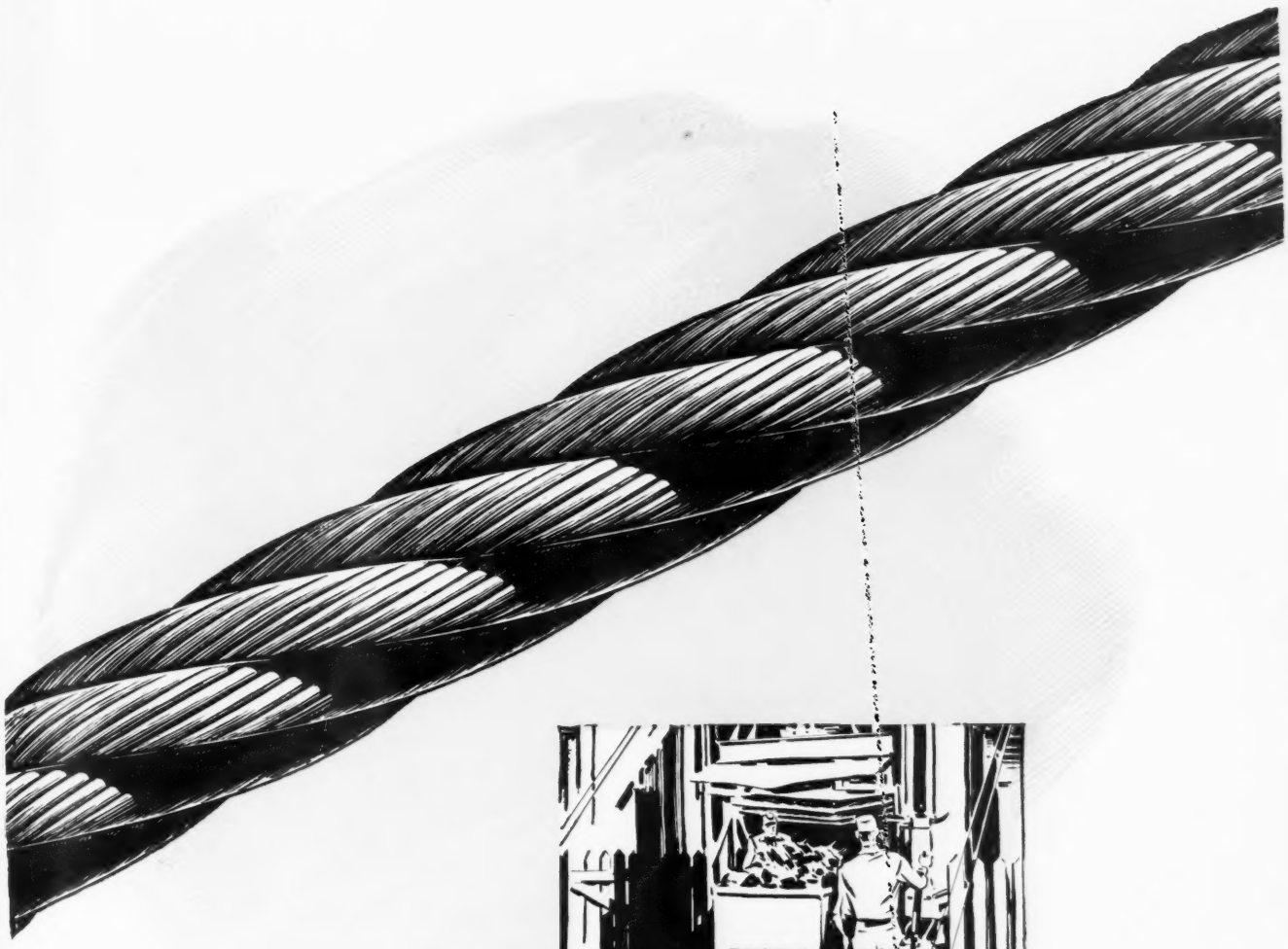
VERSATILITY . . . Haul earth, rock, coal and ore with ample power for steep grades and difficult hauls . . . fast, easy loading with efficient loading equipment — shovels, draglines, elevating graders or transfer bins . . . quick, clean dumping on the fill or into hoppers.

EFFICIENCY . . . Pay loads of 15 to 30 tons hauled at top speeds of 21.8 to 34 m.p.h. . . . fast loading by efficient digging equipment, coupled with Euclid capacity and speed, results in lower cost per yard and increased production on all lengths of haul.

Compare Rear-Dump and Bottom-Dump EUCLID performance with other combinations or types of hauling equipment and you will know why leading contractors and industrials use efficient digging and loading tools and Euclid hauling equipment to keep costs down on both long and short hauls. Your Euclid distributor will be glad to supply helpful facts and figures for your hauling requirements.

The EUCLID ROAD MACHINERY Co. · · · Cleveland 17, Ohio

EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH ROCK COAL ORE



WHEN your purchasing agent first sees the quotation, he may say that Rochester Rope comes a little high . . . But when your wire rope made by Rochester is removed from service, your accountants will say that Rochester Ropes come low in maintenance costs . . . Rochester has always been classed among the best. And the best wire rope is always the cheapest . . . After the war, with two modern factories devoted to industrial requirements, the best will still be the cheapest! . . . Just remember the name—Rochester.

ARMY E NAVY

ARMY E NAVY

Culpeper, Va., and Jamaica, N. Y., plants

ROCHESTER *Ropes*

JAMAICA, NEW YORK • CULPEPER, VIRGINIA

For use where entries are narrow

JOY FOUR WHEEL DRIVE AND FOUR WHEEL STEER SHUTTLE CAR

In many operations, more efficient mining could be conducted and economies effected by use of Joy Shuttle Cars . . . but operators hesitate to investigate this system of low-cost haulage because they fear that Joy Shuttle Cars could not negotiate the narrow turns in their room entries. Here's our answer to that . . . a specially built four wheel drive—four wheel steer Joy Shuttle Car.

This car has adequate capacity for quantity haulage in all types of mines. It is equipped with the latest type simplified wheel articulation design which has been thoroughly proved by use in Army Trucks and Heavy Duty Distribution Units. The Joy 8-SC is also provided with conveyor bottoms for utmost speed in loading and discharging cargo.

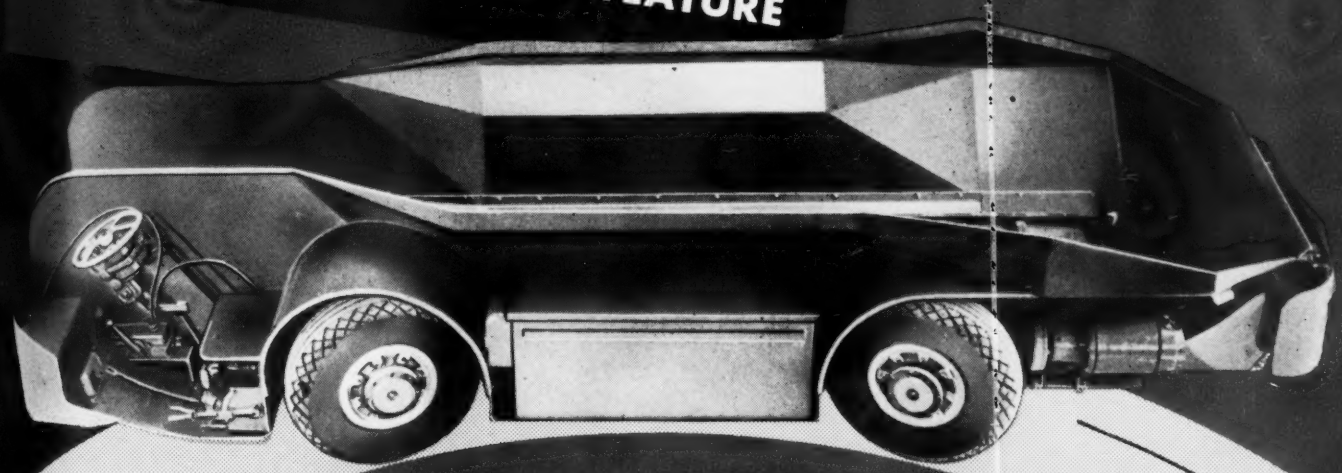
Joy Loaders are Perfect Team-mates for Shuttle Cars

Joy 11 Bu. Loader

Designed for closely coordinated, fast quantity loading in all types of mines, Joy Loaders are sturdily built for maximum production. Powerful claw type gathering arms handle the biggest lumps and the smallest with equal ease. Self-articulating patented chain conveyor can be swung 45° at the head for more efficient loading into Joy Shuttle Cars or into conveyors.

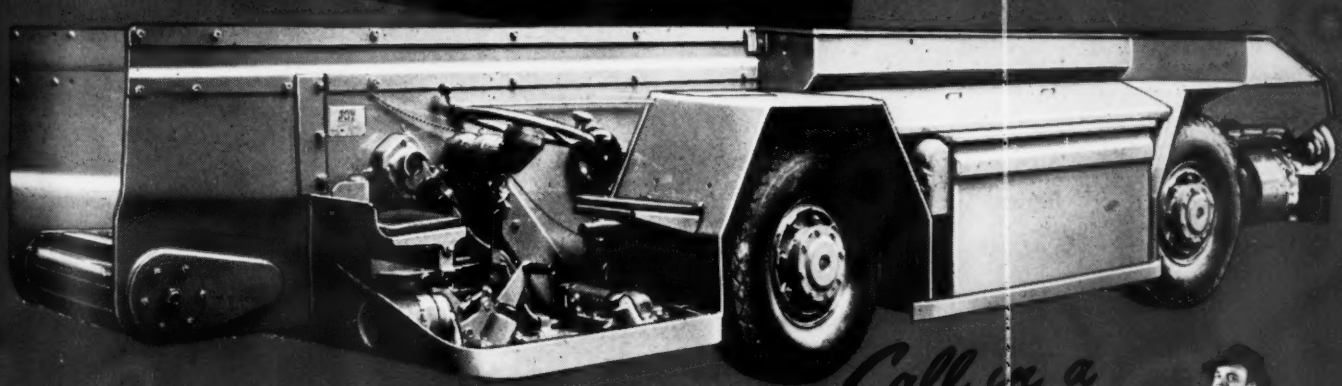
JOY 5-SC
SHUTTLE CAR HAS THE FOUR WHEEL STEER FEATURE

Turning in a minimum outside clearance radius of 18' 5" this shuttle car of 5 to 8 ton capacity will clear any pillar or room wall which has a 12' radius. The Joy four wheel steering works as smoothly and easily as the conventional type with finger-tip controls that can be reversed.

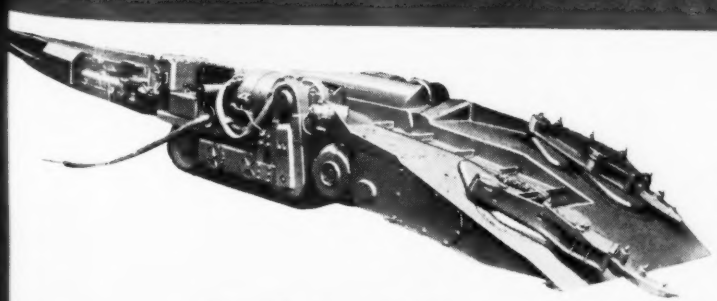


JOY 5-SC
HAS THE FOUR WHEEL DRIVE FEATURE

Made with an 8' wheel base, this particular Joy Shuttle Car may be equipped with sideboards to increase its load. When motivated by cable reel, the 5-SC model can be supplied with a hydraulically elevated discharge end for discharging into mine cars if needed. Designed specifically for use in narrow room work, it provides maximum traction for travel over bad bottoms.



Call on a Joy Engineer



Joy 14 Bu. Loader

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Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Ivan A. Given, *Editor* **February, 1945**

Trial by War

TWELVE months ago, it was stated that 1944 would be the crucial year in the United States' victory march. It so proved and the real tests—invasion of Europe and a change to the offensive in the Pacific—were met. One year ago it also was said that "Blood and treasure will have to be poured out and the United States must be prepared to pour unflinchingly when the time arrives." That time did arrive and still is here. The country is now in the midst of its second big job—maintaining the flow of material and men to the fighting fronts at full flood until victory.

How did coal measure up in 1944? What are its prospects in 1945 and the future? The record for 1944 is clear—the greatest annual tonnage in history, compounded of a new high for bituminous and a 13-year record for anthracite. These totals, it bears repeating, were achieved in spite of continued losses of manpower and increasing age of employees. There were tight spots last year and they are even tighter now, but no war or essential activity encountered real suffering for lack of coal.

Men, management and machines, plus a job well done by government men concerned with coal distribution and the flow of mining equipment and materials, were responsible for the 1944 achievement—enhanced by the fact that it was accompanied by a further reduction in the toll of life and limb. Despite some losses due to unwarranted work stoppages and a more than average degree of absenteeism, men and management pulled together perhaps better than ever before if numerous reports to that effect are any criterion. This, plus additional installations of mechanical-mining equipment and better use of existing facilities, were major factors in the 1944 production picture, while the resultant increase in efficiency augurs well for the war and postwar future. To make sure that that future will be favorable, coal also put greatly increased pressure behind its research and public relations work.

Coal still has a war to help win, however. Until that war ends in victory, and especially now, demand will continue at a high level—as high as or even higher than in 1944 for some time to come, with only a moderate drop even after Germany is beaten until Japan is finally crushed. Along with a continuation in peak demand, the industry can expect no more than to hold its present working force, with the preponderance of evidence indicating further losses before there is a gain. Unless other steps can be taken, therefore, the result can be nothing else but a widening gap between supply and demand, with increasing emphasis on conservation and control of distribution.

Coal's immediate job, consequently, boils down to keeping that gap as narrow as possible or eliminating it altogether. It is a job for men and management working together to reach new heights in productive efficiency. And it is by no means a hopeless job. An output of 6 tons per man-shift undoubtedly would make it fairly easy to reach the 620,000,000-ton bituminous goal in 1945 in spite of expected manpower losses, provided no major stoppages occur. This means no more than raising the output of every man on the job little more than 1,000 lb. per shift—a not impossible task. A similar increase would put anthracite well on the favorable side of the ledger. It all adds up to the fact that by installing every piece of equipment possible, by utilizing it at capacity, by widest possible adoption of all known methods of raising efficiency and by plain day-after-day concentration on the job of getting out every possible pound of coal, men and management can make the greatest of all contributions to the war effort while building up good will and public respect of inestimable future value.

Manpower

Leading 1945 Coal Problem

Can the Dwindling Supply of Competent Miners Produce the Tonnage Being Asked of Coal This Year? Coal Mine Presidents, Viewing Manpower as the Limiting Factor in Answering That Question, Call For an End to Absenteeism, Fair and Speedy Agreement on New Wage Contracts, and More Use of Machinery.

THE MANPOWER situation, forecast at the beginning of the year as the most critical phase of coal production, developed according to advance predictions in 1944. Against a background of steadily declining production in the last quarter of last year, coal operators once again have nominated manpower as the most critical, indeed limiting, factor in coal production during 1945. Further restrictions at the start of 1945 on the use of coal emphasize that belief that official Washington shares that belief.

Faced with the gloomy possibility that coal production, barring improvement in the manpower situation, may fall dangerously behind wartime demand this year, the operators suggest these remedies:

1. Cessation of coal-miner drafting.
2. Curbing of voluntary departures.
3. A government-supported program for replacing at least part of coal's manpower losses.
4. Reduction of voluntary absenteeism.
5. Elimination of stoppages, with which is coupled quick, fair settlement on new contracts before the deadline.
6. Maximum possible adoption and most efficient use of modern methods and equipment.
7. Maximum possible production by mine workers.

Unless these and other suggestions are carried out, numerous operators find themselves in the unhappy position of agreeing to a considerable extent with the estimates of shortages already being made by government agencies. With the year less than a month old, Secretary Ickes, for instance, placed bituminous demand for 1945 at 620,000,000 tons and production at 580,000,000, a deficit of 40,000,000 tons and a considerable change from the 1944 record of 620,000,000 tons against a goal of 626,000,000. Anthracite came even closer to its 1944 target with an output of 64,445,000 tons against 65,000,000 wanted.

Both bituminous and anthracite encountered increasing difficulty with manpower losses as the year progressed. Bituminous, for instance, showed only two weeks in the last quarter when production exceeded 12,000,000 tons, the average needed to make the government goal next year. Net loss of manpower in bituminous coal is estimated at 37,000 for the year. Anthracite fared somewhat better, its production record remaining more constant, but it also had a net loss in manpower for the year estimated at 5,000 men. The manpower decline brought bituminous coal to the point where its producing capacity was definitely below the 12,000,000-ton weekly average needed for 1945 requirements.

With these facts before them, operators naturally selected manpower as the major theme of their replies to *Coal Age*'s telegraphic inquiry to coal-mine presidents reading as follows:

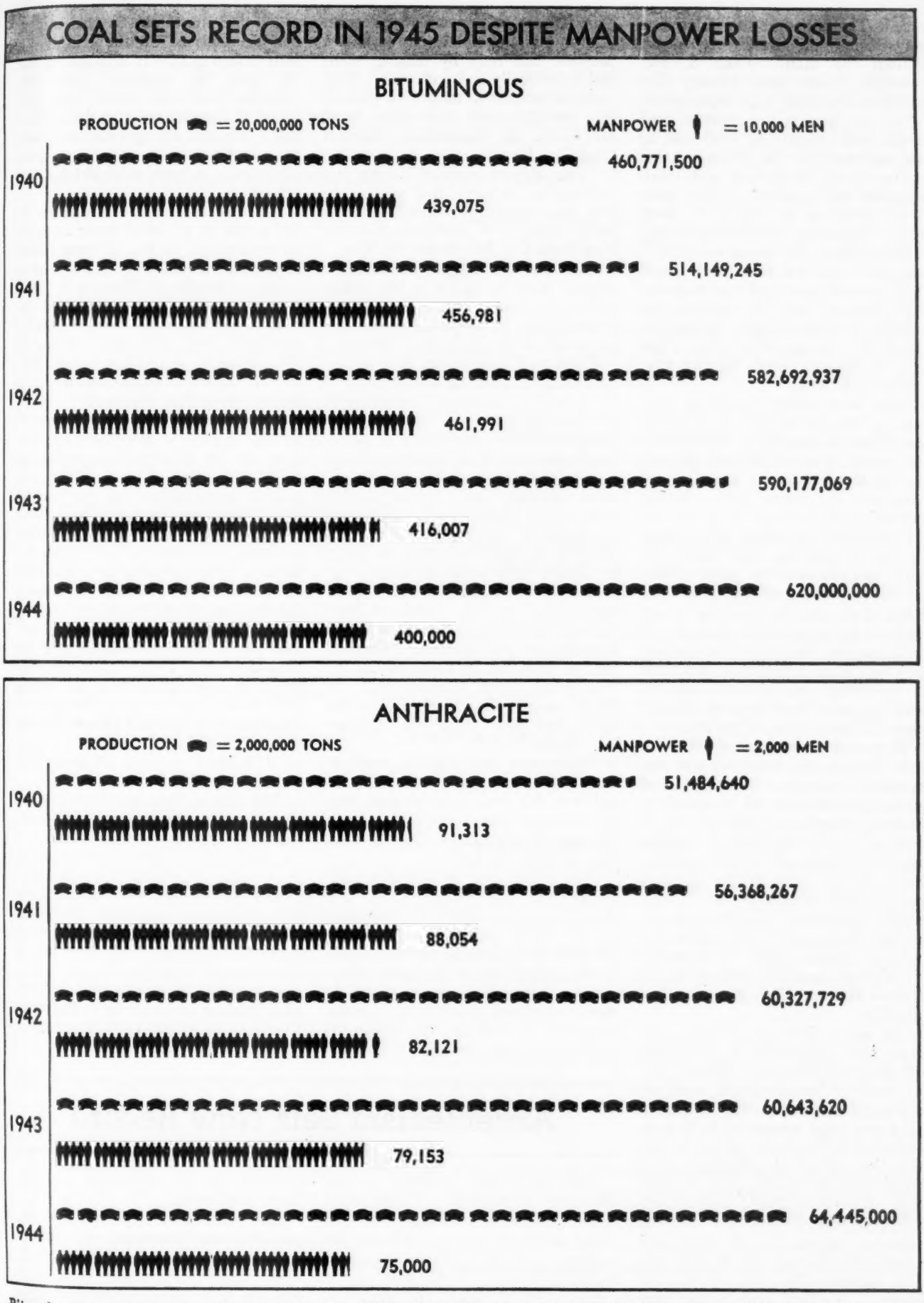
"Please wire briefly collect your views on biggest problem facing coal mining this year and how it can be met, for February issue."

No part of the country has escaped a manpower shortage, as evidenced by such replies as the following:

"A year ago, in response to your request for a statement, I said that the coal industry needed above all else unity of purpose and of action. The past year has confirmed my belief, and I would now emphasize and re-emphasize this need. Real progress has been made to this end in 1944 through Bituminous Coal Research and the Bituminous Coal Institute, both of which have had an increasing membership and an improvement in organization. Tangible results have been attained and a wider vista of opportunity has opened up. The burden of this movement is borne by a minority of the industry. My appeal is that all coal operators should join this work in so far as it may be possible for them to do so.

"Our immediate need, of course, is greater production for war needs. To this end management and men must unite in unselfish and unstinted effort. Manpower is our greatest present restrictive factor and the proper government agencies must decide where the men are most needed, whether in the mines or in the armed

COAL SETS RECORD IN 1945 DESPITE MANPOWER LOSSES



Bituminous manpower, after a rise in 1941, has shown a steady decline since 1940, last full peacetime year. Anthracite, as shown by the chart, has lost ground continually in the past four years. Nevertheless, both industries have increased their production each year, setting a new all-time high in 1944.

forces. The mines are still losing men and we cannot produce the needed coal without the men."—Fred S. McConnell, Enos Coal Mining Co.; president, National Coal Association.

"In my opinion the greatest need in the coal industry in 1945 will be men and material. As in the past, the coal resources, know-how and transportation are available. The manpower situation is critical in many areas. Machinery has been operating, in many cases, 24 hours per day, 7 days per week for over three years. Deterioration, wear and tear is alarming. Repairs and replacements are essential to maintenance of production."—K. A. Spencer, The Pittsburg & Midway Coal Mining Co., Kansas City, Mo.

"The most difficult problem confronting the coal industry this coming year is that of manpower. The gradual loss month by month of men growing too old to work in the mines is not being met by young men. If the country wishes to keep warm and the war industries operating where they depend on coal for fuel, some provision must be made for men to enter the mines. The great problem is to secure producers, for it seems a fair supply of day men will be available. I would suggest the proper authorities in Washington immediately recognize this condition and proceed with its relief."—James Prendergast, Susquehanna Collieries Co., Cleveland.

"Biggest problems facing coal industry are naturally associated with the manpower situation. I believe that smaller problems can all be solved by obtaining enough good quality labor to allow continued high rate of production. A strong and solvent coal industry will be one of the nation's greatest assets in bringing war to successful conclusion. Congress should do everything practical to assure adequate manpower supply to the mines for highest possible production."—Moroni Heiner, Utah Fuel Co., Salt Lake City.

"An acute shortage of labor confronts coal production in 1945 and with coal the keystone of industry, production must be maintained as we are confronted with shrinking stockpiles and a new wage agreement to be consummated in the spring which in past years has impaired efficiency even though the mines were kept in operation. Operators should work closely with Selective Service and the war manpower agencies both local and national to maintain and in some districts increase the number of employees. Workers' complaints, now more than ever before, should be promptly and equitably settled and the utmost effort should be made by management to prevent absenteeism. Coal miners and workers are loyal and patriotic and only by making them feel individually and collectively their personal interest in maximum production can this year's coal demands be met."—H. B. Crandell, Clayton Coal Co., Denver.

"The biggest problem facing the coal-mining industry this year is to stop the constantly dwindling manpower supply."—L. Ebersole Gaines, New River Co., Mt. Hope, W. Va.

"Manpower is biggest problem. It appears relief in this area obtainable only by releasing skilled miners from armed forces or by rating mine employment at top of draft deferment."—Charles F. Larrabee, Roslyn Cascade Coal Co., Bellingham, Wash.

"I believe that until production of war materials can be curtailed, the complete active cooperation of Selective Service and War Production Board is necessary to assure maintenance of mine manpower and machinery. Even then output probably will be less than consumption requirements, making necessary strong conservation measures by Solid Fuels Administration and elimination of strikes unless European war finished by fall. Office of Price Administration should assist in securing adequate production of commodities, as provided by Congress in the Emergency Price Control Act by liberal price policy."—R. D. Stockdale, Red Jacket Coal Co., Columbus, Ohio.

"Manpower our biggest problem. Draft deferment for those staying in industry and some curb on men leaving industry best solution."—Oscar Huber, Albuquerque & Cerrillos Coal Co., Madrid, N. M.

How many more men coal mining would lose was problematical, but there were some sign posts. An estimated 40,000 additional coal miners are needed to bring the industry's manpower capacity up to the point where it can produce the tonnage needed to meet anticipated requirements. Some hope that it will at least retain its present manpower was seen in WMC's order that most jobs in coal mining had been placed on the critical list, thus deferring miners between 26 and 30 from the expanded draft list. Whether coal will benefit from proposed 4F legislation, being discussed as this is written, was speculative, as was the number of men which might return to the industry as discharged war veterans.

An indication of how temporary relief might be achieved came from an announcement on Jan. 16 from Secretary Ickes that U.M.W. had agreed to work two Sundays in Districts 5, 7 and 8 to help overcome an immediate deficit in special-purpose coal. Sunday work was tried with some success in the anthracite region last spring. The use of women is another plan which has not been fully explored.

Any lingering doubts as to the effects of the loss in manpower and any hope by the industry that regulations might be eased during 1945 were quickly dispelled early in the year by firm action to conserve coal. War Mobilization Director James F. Byrnes indicated what may be in store for the industry when he ordered a blackout on ornamental and outside advertising lighting, extended limitations on passenger travel, and requested that home and public heating temperatures be held to 68 deg. Those orders were followed by a regulation from the Office of Defense Transportation that passenger trains be suspended where seat sale did not exceed 35 percent of capacity as a further measure of coal conservation.

The outlook, barring an unexpected change in the war or other conditions, therefore, was one of increased stress on voluntary or government-directed conservation of available supplies supplemented by renewed attempts to alleviate the manpower situation. Coal's part in this seemed to boil down to working with government agencies and Selective Service to retain present employees and, if possible, replace losses while at the same time lending its efforts to the cause of conservation.

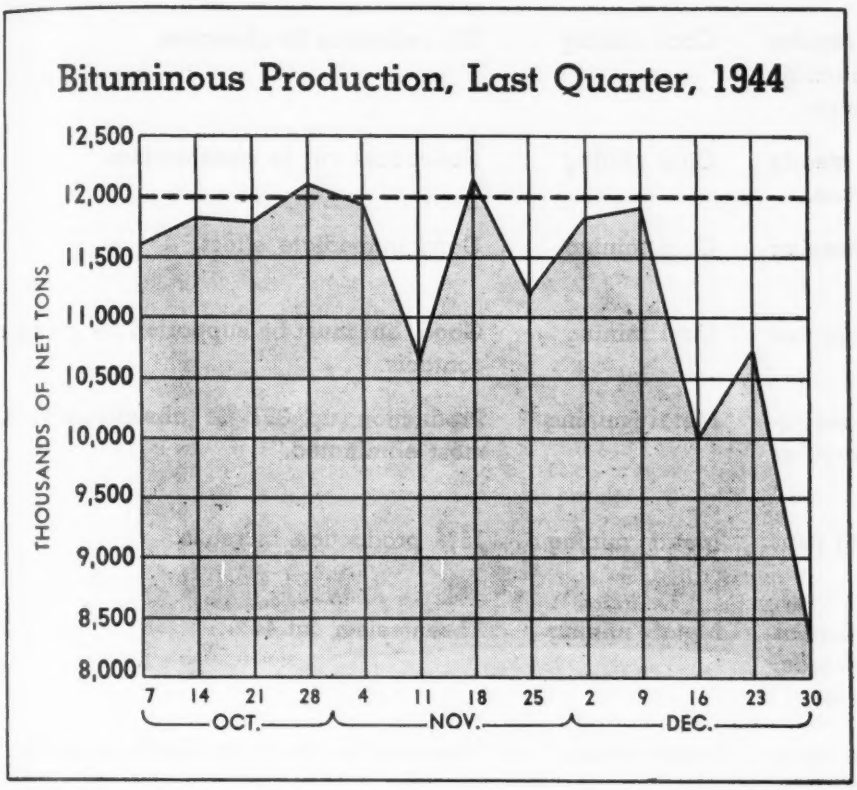
Absenteeism Sets New Record

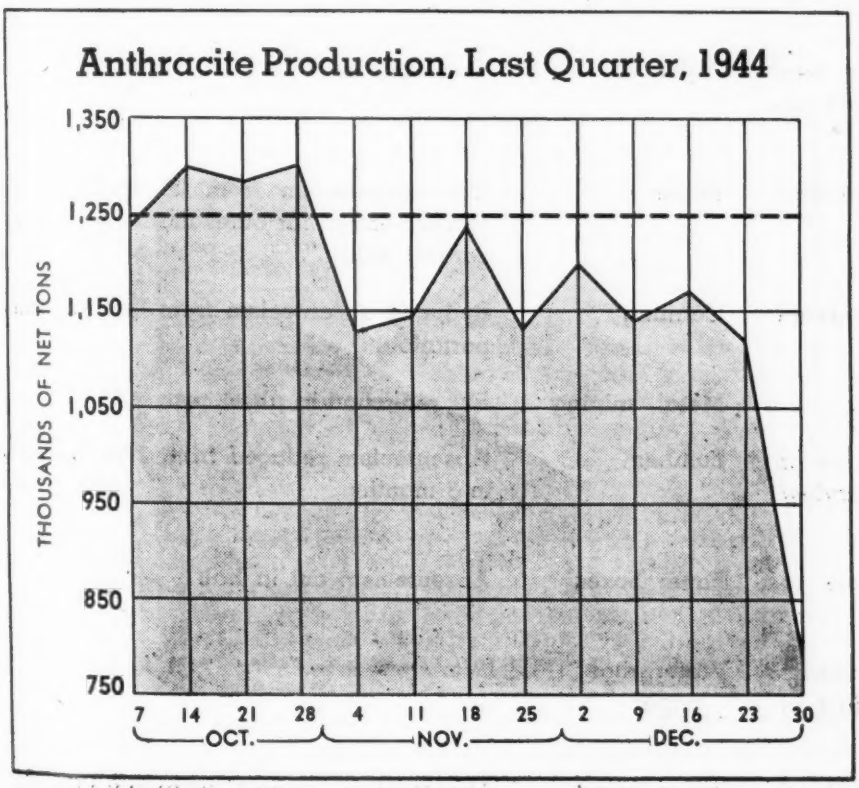
The manpower problem is not alone one of numbers. Closely allied to the question of how many men coal could count on during 1945 was the question of how often and how well would they work. Time spent on the job is a vital factor, and operators looking at the prospects for the coming year placed the reduction of voluntary absenteeism second only in importance to the recruiting of additional manpower.

Almost all fields reported that the problem was increasing in severity and that remedies, if effective at all, were largely temporary. That much remains to be done was evident from opinions such as these:

"The manpower problem sticks out like a sore thumb. Absenteeism, scan-

dalous in some instances, is responsible for much of it. Recent tightening up on deferments caused immediate improvement. With goods scarce, miners must have incentives other than overtime pay to induce them to work regularly. A 10 percent reduction in the absentee average, now running from 20 percent to 50 percent, would probably take care of nation's coal requirements."—H. E. Butler, Stearns Coal & Lumber Co., Lexington, Ky.





COAL PRODUCTION in last quarter reflects manpower drain. Both bituminous and anthracite tonnage skidded downward during the final quarter of 1944, forecasting the difficulty the industry faces in meeting 1945 goals. Bituminous reached its quota of 12,000,000 tons a week only twice and anthracite its quota of 1,250,000 tons only three times in the last three months of 1944.

"In answer to your telegram, absenteeism is biggest problem and can only be met by personal contact of employees by union and company officials."—C. A. Cabell, Carbon Fuel Co., Charleston, W. Va.

"Biggest problems are: first, absenteeism of present depleted forces and individual attitude of men toward their jobs; second, diminishing supply of experienced miners; third, increasing cost of machinery upkeep. Difficulty of replacements and impending wage scale all argue for decreased tonnage."—George B. Dick, Dick Coal Co., Walsenburg, Colo.

"The one problem facing coal mining is to produce more coal in 1945, the principal need being more coal loaders and full six days work per week from present coal miners."—Alexander Bonnyman, Blue Diamond Coal Co., Knoxville, Tenn.

"The first and biggest problem confronting anthracite this year is the same as it was last year: namely, to contribute everything possible to help win the war. In meeting it, there is no substitute for hard and steady work. Anthracite has done a good job to date, having met all burdens put upon it, though at times by a narrow margin. All prophecies of shortages have been refuted, but have probably hurt the industry's postwar position by unsettling the confidence of consumers."—J. B. Warriner, Lehigh Navigation Coal Co., Philadelphia, Pa.

"Coal's biggest item for '45 is increased production. Ultimate answer lies in each individual actually putting forth more real effort. This is not buck-passing but the only way to get more coal. Talk won't do it."—Alan J. Smith, South-East Coal Co., Cincinnati, Ohio.

"The biggest problems facing coal mining in Arkansas and Oklahoma this year are: first, extreme shortage mine labor; second, average daily absenteeism in excess of 20 percent, which disorganizes working crews underground, reduces production and enormously increases costs. Unwillingness of underground miners to work regularly six days per week is compelling buyers to look to strip mines, which are regularly contributing an increased percentage of Midwest requirements."—J. G. Puterbaugh, The McAlester Fuel Co., McAlester, Okla.

"Shortage of manpower and absenteeism our greatest concern. The miners seem to be getting too much

TESTED METHODS FOR REDUCING ABSENTEEISM

Method	Where Tried	Result
Foremen give periodic talks on regular work; war posters — changed frequently; patriotic speeches at safety meetings.	Coal mining	5% reduction in absences.
"Attendanceism" — rewarding steady work rather than punishing absence.	Coal mining	Noticeable cut in absenteeism.
Talks by war heroes and others stressing part of coal in war.	Coal mining	Good immediate effect.
Charts showing relations of tonnage lost by absenteeism to war production.	Coal mining	Good, but must be supported by personal contacts.
Bonus pay for good work with assignment of best working places to regular attendants.	Metal mining	Production up 33⅓%; absenteeism "almost eliminated."
Production bonus for crew units with penalty against unit for absentees.	Metal mining	15% production increase.
Problem referred to labor-management committee which kept accurate records, interviewed each absentee on return.	Metal mining	Absenteeism cut 44%.
Action photos showing product at war, compiled by advertising department into booklet.	Paper board	"Effective when given direct to worker."
Hiring of full-time personnel man who interviews absentees after foremen report them.	Paper	Considerable reduction noticed.
Lay off absentees 5 days; discharge after 4 layoffs.	Paper	Cut absenteeism from 20 to 6%; "not recommended for other industries without careful study."
Renting school bus to pick up workers on route.	Canning	Reduced absenteeism from lack of transportation.
Attendance contests between shifts.	Metal mining	5% reduction in absences.
Records of all absences kept; nurse or doctor checks on all; foremen interview chronic cases.	Lumber	Absenteeism reduced from 3.54 to 2.10% in 3 months.
Two employees assigned full time to check all absentees at home.	Paper boxes	Absenteeism cut in half.
Improved working conditions; periodic discussions on importance of product in war.	Waterproof paper	"Very effective."
Change from three 8-hour shifts 6 days a week to two 10½-hour shifts 5 days a week.	Paper board	Absenteeism "almost disappeared."

(With some exceptions, the above material is based on reports of the Industry Association Committee, Bureau of Manpower Utilization, War Manpower Commission.)

work and the remedy is out of the operators' hands." — ANDREW B. CRICHTON, Johnstown Coal & Coke Co., Johnstown, Pa.

"Increasing serious manpower situation undoubtedly worst problem facing coal industry. Other factors appear favorable for continued high production. Elimination of absenteeism only answer I see to problem."—HOOPER LOVE, West Kentucky Coal Co., Earlington, Ky.

"Manpower shortage and absenteeism. Better understanding of importance of coal in the war effort by miners through education will help. Traveling shows covering mining communities by personnel of the armed forces such as used during the last war would also help."—WHITNEY WARNER JR., The Warner Collieries Co., Cleveland.

"Head and shoulders above serious problems of machinery, wage scale and all else in the battle of production stands the question of manpower. Prolonged war, increasing consumption and decreasing coal stocks urgently demand the unfailing cooperation and daily hard work of every miner and an absolute end to indefensible absenteeism."—W. J. JENKINS, Consolidated Coal Co., St. Louis, Mo.

Estimates on absenteeism in the coal fields vary greatly, but there is no question that it is severe and that it is increasing. The Bureau of Labor Statistics reports, for instance, that for October, absenteeism in bituminous coal was 12.5 percent of workdays lost out of the total number scheduled. This compared with 11.1 in October, 1943, and with 6.2 for a list of selected manufacturing industries. No similar statistics were available for anthracite, but absenteeism customarily is somewhat less in those fields.

Operators have applied literally hundreds of methods to attempt to bring about cures, running all the way from suggestions that the chronically absent lose their draft deferment to cash rewards for steady work. One of the most promising approaches to the problem was developed last year through stressing attendance at work rather than the absence from it (*Coal Age*, September, 1944).

Absenteeism presents a number of specialized problems in the coal fields, and the remedies that were successful in other industries often cannot be applied to coal. But a thorough study of the problem shows that consistent attacking of it at least holds it down if it does not eliminate it ("How to Reduce Absenteeism," *Coal Age*, January, 1944). Some methods which have met with varying degrees of success both in coal and other industries are outlined on an accompanying page.

Wage Contracts a Critical Factor

Intimately related to the manpower and production problems is the matter of new wage contracts. John L. Lewis's specific demands have not been made known, although a series was outlined at the 1944 convention of the United Mine Workers, and the union is expected to insist on a wage increase of anything up to $2 a day.

The importance which coal operators attach to the outcome of the negotiations and to other problems facing the industry this year may be seen from the following opinions:

"Wage negotiation biggest problem facing coal mining industry. A just and equitable contract should be agreed upon at the earliest possible date and by all means before April 1."—FRANK CHRISTOPHER, Christopher Mining Corp., Morgantown, W. Va.

"A sound, understandable, non-inflationary contract between mine workers and operators which will enlist the earnest support of mine worker officials to eliminate unexcused absenteeism is in my opinion the major problem."—PAUL F. KEYSER, Independent Coal & Coke Co., Salt Lake City, Utah.

"The continuation of the war into 1945 poses serious problem for coal industry. With shrinking manpower, lessened efficiency in men and equipment, both anthracite and bituminous may fall many million tons short of meeting consumer requirements. Anticipate disturbed labor relations similar to occurences in 1943 unless some central control in Washington is authorized to handle all phases of coal problems. Operators and miners can settle their differences only by staying within framework of War Labor Board decisions and seriously doubt their ability to negotiate wage agreement quickly with assurance that it will be final agreement. After approval War Labor Board agreement must still be approved by OPA, Vinson and Treasury Department, and long delay is bound to result and undoubtedly keep industry in turmoil for many months. Weakness of present set-up is that bureau having power to set wage standards has not power to grant compensating revenues."—JAMES H. PIERCE, Pierce Management, Inc., Scranton, Pa.

"The major problem confronting coal mining industry this year will be an insufficient supply of competent, dependable labor. Assuming that the wage contract will be made without the indefensible bickering, delay and strikes suffered in 1943 and new recruits to industry can be made to understand that their obligation is equal to that of our old and dependable men, the industry will go through year successfully. The immediate added required supply of labor lies in reduction of excessive absentee list who occupy needed living space while walking the streets and yield minimum output when employed. There are ample mines and equipment to supply needed coal."—EUGENE MCAULIFFE, Union Pacific Coal Co., Omaha, Neb.

"I think biggest problem facing us this year that of labor shortage. Have had no young men for four years and old men getting older. Full advantage should be taken of existing deferment rights of production men and every effort must be made to utilize existing labor-saving equipment wherever possible."—HERBERT E. JONES, Logan County Coal Corp., Charleston, W. Va.

"Biggest problem facing coal industry this year is satisfactory contractual relations with labor. This depends on reasonableness of miners and operators and real desire on both sides to make a contract without government intervention. Other important problems are manpower and free flow of all necessary supplies. Successful handling of these problems rests with government agencies."—R. H. SHERWOOD, Central Indiana Coal Co., Indianapolis, Ind.

Grave concern has been expressed by many sources over the consequences if the union and the operators fail to reach an agreement by April 1. The loss of even a few days' output would be disastrous to 1945 totals, already subjected to unusual pressure because of the lack of manpower.

Some hope for a speedy agreement is seen in the fact that a number of the leading operators have already discussed the situation among themselves and are prepared to enter the negotiations better equipped as far as unity of action and counterproposals are concerned than in the past.

The danger of a third government seizure of coal mining properties is not to be discounted. If the two parties fail to reach an agreement by April 1 and if the almost inevitable work stoppage follows, it is regarded in Washington as virtually certain that the President will once again order Secretary Ickes to seize and operate the mines pending the signing of a new contract.

CONTRACT NEGOTIATION:
Problem and Opportunity for Coal

Have Past Negotiations Resulted in Wage Agreements Contributing Everything Possible to Progress in the Coal Industry? — Many Feel They Have Not — Some Reasons Why and Suggestions for Improvements Are Outlined in This Study of Recent History in Contract Making

By **IVAN A. GIVEN**
Editor, Coal Age

NOW THAT the United States is facing the most critical year in its war effort and with it coal mining is confronted with its most critical manpower situation, the problems of wage contracts and methods of negotiating them are thrown into even higher relief. Coal has not been too happy with the results of what is termed "collective bargaining." At times, even the miners probably have had to squelch some doubts as to the efficacy of the process and it is no secret that numerous operators feel that a change should be made to something better calculated to serve the interests of all concerned.

Analysis of developments in contract-making in coal mining in the past decade or so could be tackled from a number of standpoints. A logical one, however, seems to grow out of an assessment of the benefits to the various parties concerned—miners, operators and, by no means least although last, the public. If justice is done, it also is logical that not one, not two but all three should benefit equally from any bargaining that truly bears the name. What, actually, has happened?

Looking back over the years it is immediately apparent that the miners have benefited substantially from steadily rising wage rates, reductions in hours of work with the same or better earnings and other concessions of various types.

That conclusion could be elaborated on, but no one disputes the right of the miner to good wages based on a fair day's work, as well as to good working and living conditions. However, what about the interests of the other parties? The benefits to the public are somewhat more difficult to assess, since one of the results has been higher costs. But since the public seems disposed to tolerate if not accept wholeheartedly the extra costs imposed by the demands of the union leaders—and the inconvenience resulting from attempts to enforce those demands—perhaps it feels that what it considers to be the benefits, usually lumped under the heading "social gains," more than offset the extra cost and inconvenience. It is only fair to point out, however, that some sections of the public have been inclined to evade the more disagreeable aspects of the working of this philosophy by switching to competitive fuels and energies under the pressure of rising costs and interruption in service.

Share and Share Alike?

Coal operators, even if the union leaders are satisfied, can scarcely regard this switching as a benefit. In fact, it also is difficult to assess the returns to the operator from developments in recent years beyond the fact that wage rates and working conditions are fixed and known—at least for the duration of a specific contract—and thus result in stabilization to that extent, plus also the fact that the operators share in any benefits flowing out of a wage structure that insures good purchasing power among mine workers—a condition they welcome as much as anybody.

The law of diminishing returns, however, operates just as effectively when steady increases in wage rates are involved as in any other field. Good wages are accepted as essential but extremes encourage coal's competitors and in the end hurt the industry and the earning power of its employees by reducing production. There are signs already that this is a problem of some magnitude, and the effects of such a policy have been visible in certain other industries for some time.

The ideal state, it is argued, is one of equilibrium—a state providing the highest possible income to employees without increasing cost to consumers too much and thus preventing a normal expansion of output with reasonable profit to investors. From this it follows that attempts to wring excessive wage rates or earnings out of the industry and the public are bound to hurt employees, managements and investors in the long run.

At this point it might be asked what the negotiations and contracts of recent years have contributed to the desired state of equilibrium and due regard for the interests of all parties concerned.

Taking the bituminous industry, it might be held as agreed that the Appalachian contract of 1933 was a fair attempt to honor the interests of all parties. Among its other provisions, the agreement provided for eight hours of work "at the usual working place for all classes of labor, exclusive of lunch time," with a limit of 40 hours per week. Management rights were affirmed in the following clause:

"The management of the mines, the direction of the working forces and the right to hire and discharge are vested exclusively in the operator, and the United Mine Workers of America shall not abridge these rights." This initial agreement also includes a further clause which takes on added significance in the light of recent developments:

"The term mine worker as used in this agreement shall not include mine foremen, assistant mine foremen, firebosses or bosses in charge of any class of labor inside or outside of the mine, or coal inspectors or weighbosses, watchmen, clerks or members of the executive, supervisory and technical forces of the operators" ("sales" added in the 1939 agreement).

The 1933 contract, of course, was made in an atmosphere implying action unless the operators came to terms, and in the proceedings leading up to the 1934 agreement, General

Collective Bargaining for Coal

OBJECTIVES:

A closer approach to the goal of harmony and cooperation between miners and operators for the good of the industry, the consumer and the public.

Promotion of the interests of miners, operators and the public.

Protection of the rights of miners, operators and the public.

Good wages for miners.

Reasonable returns to investors.

Lowest costs to consumers.

Elimination of stoppages and interruptions in service.

NEEDED:

Better public understanding of the industry and its employer-employee relations.

An improved negotiating organization.

Elimination of government interference in contract making.

Acceptance, by all parties concerned, of the idea that contract making is not a matter of wresting concessions from the opposition but instead is an opportunity for advancing the interests of the industry and of the nation.

Johnson, NRA administrator, effectively ended objections by some operator groups to a proposed agreement by ordering, under the guise of an emergency and without hearings, a 7-hour day at the face and a 35-hour work week throughout the industry—the first example, in modern times at least, of contract by government fiat. The cut in working hours was accompanied by an increase in wage rates, in addition to other concessions.

Stoppages Reinforce Demands

Northern and southern operators joined together in opening negotiations for the agreement of 1935. The list of demands submitted by the miners was distinguished by another increase in length, and government intervention, while not as direct, was still as firm and as heavily weighted on the side of the union leaders. John L. Lewis reinforced his demands with five work stoppages and President Roosevelt took a hand before an agreement was signed Sept. 26, to go into effect Oct. 1, 1935. Wage rates were raised once again.

The 1937 agreement, with still another wage increase and time and one-half for overtime, was signed April 2 after a stoppage of one day. New demands, aside from a six-hour day, a 30-hour week and more money, included a guarantee of 200 days of work a year and vacations with pay.

The list of union demands was even longer when 1939 negotiations got under way. New ones included seniority, a new "recognition clause," a limitation on number of men classed as "foremen" and on their duties, double time for Sunday and holiday work and use of nothing but union-made tools and supplies. A six weeks' stoppage of work and Rooseveltian intervention—again directed at getting the operators to capitulate—preceded final agreement. Department of Labor Conciliator John R. Steelman, who later figured so unhappily in the captive-mine case of 1941, also made his first appearance on the coal-mining scene. As a result of government intervention, the union finally came out with its highly desired "union-shop" clause, reading as follows:

"It is agreed that the United Mine Workers of America is recognized herein as the exclusive bargaining agency representing the employees of the party of the first part. It is agreed that as a condition of employment all employees shall be members of the United Mine Workers of America, except in those exempted classifications of employment as provided in this contract." The exemptions referred to were the same as those in the 1933 agreement, and an explanatory note declared that the rights of management remained as before.

With the United States embarked on its defense program, the union leaders resubmitted their 1939 demands, with additions, in 1941. Work stopped April 1, largely as a result of the union's demand that extension should be predicated on making any benefits to the miners retroactive—the first time this proposal had appeared since it was brought up by the union in 1934. Anticipating what eventually came to pass, the operators proposed, among other things, lengthening the work week to six days of seven hours or five days of eight hours.

Proposals to eliminate its differential resulted in the South withdrawing from the conference. After being worked over by President Roosevelt, Jesse Jones and the National Defense Mediation Board, and after the President had declared another "national emergency," the Southerners capitulated and accepted the loss of their differential as a contribution to the defense effort. The miners as a result won a wage increase, plus, in the South, an addition represented by the differential; also a week's vacation with payment of $20, safety pit committees, seniority and a "protective wage clause."

This clause was used, after the act, to excuse a widespread walk-out at commercial mines during the course of the union campaign to force the union-shop agreement on the captive mines later in 1941. After Lewis defied and wrecked the National Defense Mediation Board, the dispute went to the President, who declared that "the Government of the United States will not order, nor will Congress pass legislation ordering, a closed shop." But Lewis got his way through the medium of an arbitration panel suggested by Roosevelt. With Lewis and Benjamin F. Fairless as two members, Steelman resigned temporarily "to represent the public" and voted with Lewis to put the proposal over.

No Collective Bargaining

Up to and including the agreement of 1941, it might be said that some elements of true collective bargaining were present, although, as in the captive-mine settlement, the process sometimes smacked more of concerted action by union leaders and federal officials. The agreement of 1943 (actually 1944), however, was anything but collective bargaining from the time Lewis announced that he was out for $2 a day and nothing less would suit him, stabilization measures notwithstanding.

A review of what happened would take a book, so it might suffice to point out that the operators were stopped from meeting Lewis' demands

by stabilization regulations, including the "hold-the-line" executive order of April 8, 1943, and subsequently were penalized for stoppages called by Lewis by having their properties seized. The penalties—for it is difficult to call them anything else—did not stop there. WLB and other government agencies and officials successfully paved the way for fastening the portal-to-portal system on coal mining. This, it might be argued, was not too bad in itself, but they succeeded in doing it in the worst possible fashion.

Another long-standing practice in the industry was swept away by WLB when it ordered mining companies to supply tools and abolish lamp and blacksmithing charges, in addition to increasing the vacation payment to $50, plus other concessions. In addition, the industry also was stuck with the principle of retrocative application of benefits, which even its advocates hardly bother to deny favors the union leaders in any negotiations.

Government Displaces Operators

Above all, the operators had very little to do with the final settlement, which found certain government agencies and officials moving in and issuing orders or making deals with gay abandon, leaving the operators with little to do but sign either voluntarily or, in many cases, under duress. Small wonder, therefore, that many operators, looking back at what they got for trying to conform to stabilization regulations, should be inclined to the belief that they too should have forgotten stabilization and compromised with John.

Necessarily brief, the preceding review lacks much of the color and details useful to the man looking for a solution to the problem of collective bargaining in coal. But even a cursory inspection of the record warrants these conclusions:

1. The union has chalked up steady gains in earnings and other concessions.

2. Real collective bargaining is hampered by the fact that in case of disagreement the union leaders can look to—at least to date—the support and assistance of the Federal Government, or at least certain of its agencies and officials.

From the wage standpoint the union has benefited by substantial increases from $4.20 and $4.60 base for an eight-hour day to $7 for a seven-hour day, in addition to other major concessions. How about the operators? Here the benefits, if any, are not nearly so evident, beyond anything that might be credited to the stabilizing features of formal wage contracts, against which should be debited increased attempts at invasion of their rights and a tougher battle against competition.

Above all, how has the public benefited from alleged collective bargaining in coal? Presumably, since it approves—at least by inaction—what has happened, it must feel that some benefits are being derived. Are they in the cost of coal? The answer is no, in spite of the millions of dollars spent by the operators to offset the cost of wage increases and other concessions to the union leaders in recent years.

Average value of bituminous coal at the mines was $1.34 per ton in 1933. By 1941 it had risen to $2.19 (including selling cost). The 1943 figure was $2.69. Were major increases in company profits the leading factor in this rise? Not if figures collected by the Bituminous Coal Division are any criterion. In 1936, cost exceeded realization by 4c. per ton; 1937, 9c.; 1938, 11c.; 1939, 1c. In 1940 the tide turned and realization exceeded cost by 1c., going up to 7c. in 1941 and 8c. in 1942—a rather modest margin on a cost of $2.27. Anthracite realization followed a similar course, rising from $4.46 in 1933 to $4.59 in 1941 and $5.38 in 1943.

No Gain in Service

If it is assumed that the public is willing to pay more because of a belief (that may or may not be founded on real knowledge of the situation) that it benefits because the miners benefit (unless it ducks the question by going to another fuel), how did it come out on another score: continuity of service? Again the answer is: "Not so good." As the years have gone by the tendency of union leaders to interrupt production to gain their demands has increased, with 1943 an example in point. Despite the fact that the country was engaged in a war for survival, the union leaders maintained four stoppages to back up their demands. The result was loss of opportunity to produce some 35,000,000 tons of badly needed coal.

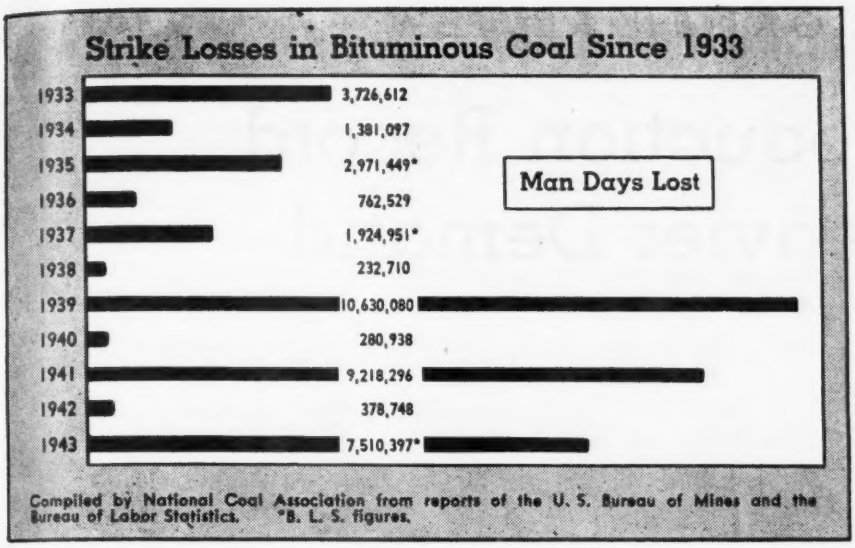
Final settlement did not end the stoppages. District 50 of the United Mine Workers did not hesitate to close down mine after mine in 1944 in an effort to force organization of supervisors and was halted only—temporarily—by the seizure of the affected properties and action by WLB to hear the cases—after the organization had lost out before NLRB. These strikes, which largely affected properties producing badly needed metallurgical and special-purpose coals, were estimated to have cost some 7,000,000 tons of production—about the margin by which bituminous missed its 1944 production goal. This question, and the equally serious ones of use of union-made materials and tools and a demand that the operators agree to strikes to support organization activities in other industries, were still confronting the industry as it went into 1945.

Has Goal Been Reached?

All in all, the evidence backs up the conclusion that what is termed collective bargaining has not achieved its primary objective in coal mining: equal benefits for all parties at interest. One fact supporting this conclusion is that the gains are predominantly one-sided—in favor of the union. It also is a fair conclusion that a real meeting of minds cannot result when supposedly neutral authorities—federal officials—throw their influence to one group—again the union leaders. Perhaps the public might be classed as favoring the union leaders because it has not spoken out against their course and against the support lent it by the public's purported representatives and servants in government positions. A clear answer to that question would require proof, however, that the public is aware of the exact situation. There is as much evidence that it is not as that it is.

The foregoing, let it again be said, is not to be construed as begrudging the miner a good income or good working and living conditions. But it is perhaps in order to point out that beyond the point of reasonable equilibrium insistence on additional concessions will result in permanent injury to coal mining and to every employee and investor in it. Whether union leaders and their supporters in government have ever considered that possibility does not appear on the record, although it is a safe bet that of everybody concerned the government officials in question have the least idea of the meaning of real cooperation between employer and employee in coal mining.

Along with union-leader intransigence, official favoritism and passive acceptance by the public, collective bargaining also has suffered through the cumbersome negotiating system employed in the past. Many operators characterize it as practically a town meeting, with all the disadvantages such as a group would labor under in negotiating—because it has to—a difficult contract with one man armed with complete authority. The system also favors splits between oper-


Strike Losses in Bituminous Coal Since 1933
Man Days Lost
1933 3,726,612
1934 1,381,097
1935 2,971,449*
1936 762,529
1937 1,924,951*
1938 232,710
1939 10,630,080
1940 280,938
1941 9,218,296
1942 378,748
1943 7,510,397*
Compiled by National Coal Association from reports of the U. S. Bureau of Mines and the Bureau of Labor Statistics. *B. L. S. figures.

One byproduct of collective bargaining in coal mining—a heavy increase in work stoppages in contract years in the bituminous industry.

ators. Such splits have figured prominently in past negotiations, usually to the discomfiture of some operator groups, if not the entire industry. Not to put too fine a point on it, past performance has convinced many operators that the system leaves much to be desired.

To summarize, many feel that the operators have had nothing more than a loose aggregation of individuals with which to go into conference with one man with complete power, the backing of at least enough government officials to serve and the passive, if not active, indorsement of the public. On that basis, it is argued that a revision in organization and negotiating methods certainly would be a step forward, even though a tough union leader with official backing still would constitute a formidable combination.

Understanding the Key

In view of that combination, it also is argued that the revised organization should be supplemented and reinforced by intensive long-term work in public and employee relations—work that would bring about a real appreciation of the factors involved in true collective bargaining and cooperation between employer and employee, as well as an end to government partiality.

Theoretically, at least, the 1945 program calls for the operators dealing with the union leaders on an industry-wide basis. Advantages include giving operators in outlying districts a voice in formulating the contract they finally would sign rather than accepting the terms of an agreement they had no part in drawing up. However, it is no bar to attempts by union leaders to split out a group or groups for a separate agreement, which then would be forced on the rest of the industry. Neither would it prevent government intervention to back up such a program or to force an agreement by fiat. With a number of mines still in possession of the government, fiat settlement became an even stronger possibility, especially in view of the agreement signed by government authorities in the second seizure of 1943, which the indusery then accepted under circumstances lacking at least some of the elements of free choice.

With conditions as they are today there is no blinking the fact that any employer group has a difficult task in contract negotiations if the union leaders wish to make it so. The prevailing practice is for union leaders to present a new series of demands each time, after which they, their government supporters and, perhaps, the public sit back and in effect ask the employers "How many are you going to meet?" That is hardly collective bargaining, but it is what many people, especially union leaders and many government officials, seem to think is collective bargaining.

It is a condition that is hard to take, but as long as it prevails it is necessary to take it into consideration. That undoubtedly motivates those who say that it is better to compromise where it will result in the least damage, even though there is strong reason to feel that the concessions were not fully justified, rather than get embroiled in a fight that might finally result in having to give up under pressure some fundamental rights or suffer a stoppage that would materially inconvenience the public and breed a reaction permanently damaging the industry. With a war going on and the country desperately needing every pound of coal, the conclusions of these operators that any reasonable compromise not involving fundamental right would be justified was even easier to arrive at.

Assuming no government interference with a meeting of minds, the term "reasonable" might be examined. If it were a question of money, some call attention to the fact that it is well, even for union leaders, to remember that, after all, there is a future and that the competition to be met therein must be considered. The fundamental principle that unreasonably high wage rates foster competition and cost coal both tonnage and employment still remains in effect. But it also is accepted that if all parties, union leaders as well as operators, approach negotiations with the idea of promoting cooperation and facilitating production, plenty of room can be found for formulating an agreement benefiting everybody all around the board.

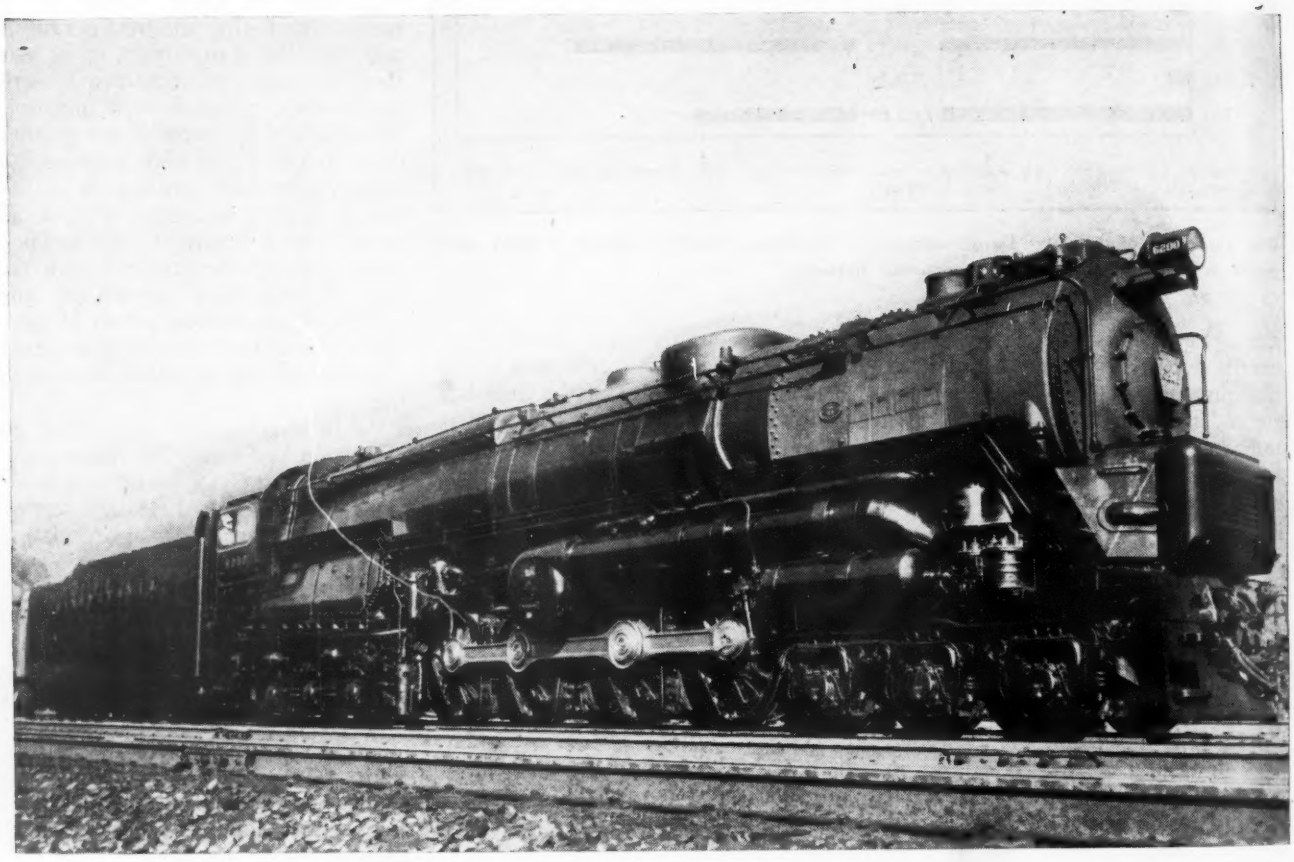
As to the type of negotiating organization, thinking by many operators was crystallized by developments in arriving at the 1943 and earlier agreements around a small negotiating committee—or even one man—with authority corresponding to that of the union leader. Flexibility and ability to settle at the propitious moment are the major advantages offered for this plan, which its supporters feel would facilitate agreement with a minimum of stoppages, if not their complete elimination. Against these some operators make the point that a small group might encounter difficulty in knowing and appreciating the individual problems of every producing district which their decision nevertheless would affect.

Mutual Benefits the Goal

Development of a negotiating organization able to function with the necessary efficiency may or may not be a long process, although there is reason for being confident that substantial advances are in the offing. Whatever the final form, the over-all goal, as always, will be promotion of cooperation between miner and operator to their mutual advantage, as well as to the advantage of that even more important member of the triumvirate —the public. The ideal is quick, fair settlement of legitimate questions, with preservation of the rights of each party and of the public, and without interruptions in production and service. Collective bargaining can yield maximum results only when *all* parties direct their entire efforts to this ideal.

COAL IN REVIEW

All-Time Production Record Parallels Heavier Demand



COAL BURNER AND COAL HAULER—This turbine locomotive is one of the new types developed or to be developed with the support of the coal industry, and to which the industry looks for help in holding and expanding one of its major markets.

RECORD-BREAKING PRODUCTION, falling only slightly short of government requirements, was the coal industry's contribution to the war effort during 1944. Bituminous coal, producing 620,000,000 tons, exceeded any previous record even though it failed to reach the 626,000,000-ton goal set by the Solid Fuels Administration for War. Anthracite, producing 64,445,000 tons, its largest output in 13 years, failed by only 555,000 tons to meet SFA's request for 65,000,000 tons.

This production record, by far the best the industry has ever made, becomes even more remarkable in that it was achieved in the face of a steady decline in manpower in both bituminous and anthracite to new lows for modern times. Employment in the bituminous industry is estimated at approximately 400,000 in 1944 compared to 416,007 in 1943 and 461,991 in 1942, the high mark for the war period.

Anthracite's record was similar. The Bureau of Mines listed 79,153 men employed in 1943, against 82,121 in 1942. The decline continued through 1944, in which year it is estimated that employment did not average more than 75,000. In contrast, bituminous production was up 5.1 percent in 1944 while anthracite tonnage was 6.3 percent greater.

Bituminous coal started the year and continued well into the third quarter as though it were going to make the government goal with ease. Production averaged more than 12,000,000 tons for many weeks and even the summer season did not seem to affect it more than casually. However, the strain on manpower began to tell in the last quarter and in December production was an estimated 6,000,000 to 7,000,000 tons below normal. That slump was brought about by a combination of Christmas holidays and adverse weather conditions, in addition to shortage of men. Snow and floods shut some mines and prevented thousands of miners from reporting for work, adding to losses previously suffered by strikes and other interruptions.

Anthracite maintained a more steady pace during the year, although losing some production to work stoppages

during the fall and an estimated 400,000 tons during the Christmas holiday season. SFAW estimated that the industry during the year lost a little more than 1,000,000 tons through work stoppages.

Despite this production record, shortages continued to exist and the prospect for the coming year was that supply would be tighter than ever. Bituminous shortages were in large measure in special-purpose and metallurgical coal, especially from Districts 7 and 8, and steps were taken during the year to curtail the use of such coals as domestic fuel to maintain an adequate supply for steel mills.

There was little indication that demand would decrease during the coming year, and the situation was further complicated by the declining production rate during the last few weeks of 1944. No week in December, for instance, showed production of much more than 11,000,000 tons.

Consumption apparently ran close to production in 1944, the best present estimate being about 618,000,000 tons. That meant that stockpiles of bituminous coal were about the same going into 1945 as they were at the start of 1944—an estimated 57,000,000 tons. Days' supply, however, was slightly down, since demand was increasing.

Favorable weather helped to increase 1944 lake shipments over 1943, 60,333,315 tons, a new all-time record, being delivered. Both anthracite and bituminous coal to New England showed gains.

Distribution Control Tightened

The unprecedented demand for coal for both war and civilian needs necessitated increasing control of distribution, and while the industry avoided coupon rationing, strict supervision of supplies to both industrial and domestic users was exercised by SFAW. Regulation 17, for example, issued March 23, outlined procedure for consumer declarations and the responsibilities of dealers in anthracite distribution. The regulations provided that only 87½ percent of the tonnage burned during the base period by consumers could be sold to them during the 1944-45 season, and that no more than 50 percent of the season's requirement could be delivered before Oct. 31, 1944. The latter restriction was subsequently lifted.

To conserve scarce metallurgical coals from Districts 7 and 8 and to assure supplies to consumers who could not buy alternate fuels, a new preference system for distribution was established under Regulation 23 in July. Byproduct and special-purpose coal was placed first on the preference list, lake coal second and retail dealers third. A previous step to allocate District 7 and 8 coals was contained in Regulation 21, which permitted dealers to deliver no more than 75 percent of the season's requirements up to Oct. 1.

An indication that no lessening of distribution control could be expected this year came from Secretary Ickes early in 1945, when Reg. 24 was issued governing receipts and shipments of special-purpose coal during the coal year April 1, 1945-March 31, 1946. Other restrictions, embargoes and similar steps reflected further the serious view being taken by distribution authorities.

Competition Still Active

The constant strain on supply offered a market for all types of coal and for as much as could be produced, but despite that condition the industry did not lose sight of its competitive position during the past year. What it saw was not altogether heartening. Fuel oil and diesel power continued to make inroads in the railroad field, with the result that coal increased its sales to railroads on the basis of the first ten months of 1944 by only about 1.1 percent over that in the same period in 1943, while liquid fuels were increasing theirs 1.7 percent. Along the same line *Railway Age* reported in December that Class I railroads had ordered 74 steam and 596 diesel engines during the year and that 321 steam and 847 diesel locomotives had actually been produced for domestic service during 1944.

Coal likewise fell behind in the generation of electric energy, the report for the first 11 months of 1944 showing an increase for coal of 4.3 percent against an increase of 23.8 percent for oil and 21.8 for natural gas.

One large natural-gas pipeline was completed during 1944, and applications for various others were pending as the year ended. The Tennessee Gas & Transmission Co. finished its 24-in. system from Corpus Christi, Texas, to Cornwall, W. Va. Applications were pending for pipelines to the Atlantic and Pacific coasts and to the Middle West. During the year considerable talk was heard about the possibility of using the Big Inch and Little Inch lines, now delivering oil to the east coast from Texas, as natural-gas lines after the war. However, two factors helped coal in its competition with natural gas during 1944. The Federal Power Commission authorized an investigation into competition between the two fuels, and the Texas State Railroad Commission considered halting export of the fuel from Texas because of dwindling supplies.

Sales of both natural and manufactured gas increased during the year. Manufactured gas sold 487,245,000,000 cu.ft. for a gain of 4.8 percent over 1943, while natural gas sold 2,189,206,000,000 cu.ft. for a gain of 10.2 percent.

Crude oil production during the year was approximately 1,677,000,000 bbl., or 11.3 percent more than in 1943. Late in the year, eastern householders who had converted to coal from oil were permitted to change back, but few apparently have done so to date.

The threat of competitive fuels, however, did not go unchallenged. Even while engaged in producing a record-breaking war tonnage, the industry found time to make plans for holding and expanding its markets in the postwar era.

Anthracite Heater Offered

Two of the most significant developments in research during the year were the "Anthratube" developed by Anthracite Industries, Inc., and the "bungalow furnace," developed by Bituminous Coal Research, Battelle Memorial Institute and leading stove manufacturers. The Anthratube is a new, compact heating unit promising real help in the hard-coal market battle in the future. The bungalow furnace is a bid to capture the low-cost home-heating market.

The threat of diesel competition spurred research into coal-burning locomotives during 1944. Late in the year, the Pennsylvania R.R. put on its demonstration of the first steam turbine locomotive built in the United States. Almost at the same time, nine railroad companies announced that they had raised $1,500,000 to build an experimental model of a turbo-electric locomotive. Early 1945 brought the news that a group of railroads and coal operators had combined to provide funds for research into coal as a locomotive fuel.

Interest in smoke abatement, both as an immediate and as a postwar problem, continued lively during 1944 and one concrete advance in coping with the problem was demonstrated by the Louisville & Nashville R.R. at Nashville in October when the overfire air jet was successfully operated before a gathering of railroad men, city officials and coal operators. The jets, costing about $200 apiece, have been applied to several L.&N. locomotives and plans were developing for their use

by other roads as well as in industrial and other applications.

The government aided research into coal utilization with the passage late in June of the O'Mahoney bill authorizing expenditure of $30,000,000 for study of synthetic-fuel development and the construction of pilot plants. However, only $5,000,000 was actually appropriated, placing the matter virtually on a one-year basis. A plant was authorized for Bruceton, Pa., near Pittsburgh, and will be ready for operation late in 1945. The U. S. Bureau of Mines created a new Division of Synthetic Fuels to handle matters in this field.

One of the unusual announcements of 1944 was that of the Blaw-Knox Co., Pittsburgh, which has begun construction of a plant in Philadelphia to produce "White-Glove" coal, a packaged fuel consisting of 80 percent anthracite and 20 percent bituminous fines. The plant will have a capacity of 150,000 tons a year.

Continuing its efforts to bring the advantages of bituminous coal before the public, Bituminous Coal Institute in August announced a prize contest among architects for plans for "flexible heating" in the design of homes so that they can use any of the major fuels. Prizes totaling $1,750 in war bonds were offered.

Research continued in plastics, explosives and medicines, with coal playing an important part either as a raw material or as a processing agent. In addition, continued progress was noted in the design of stokers both for domestic and industrial use, but marketing of many of the improvements was delayed until materials are freed from war requirements.

COAL IN REVIEW

Strikes and New Seizures Mark Government and Labor Relations

COAL IN 1944 not only produced a record tonnage to meet the nation's military and civilian requirements but it also went through the year without the major work stoppages or government operation that kept the industry in a turmoil through much of 1943, although efforts by District 50, United Mine Workers, to organize supervisory employees resulted in the third seizure of some mines by the government after they had been closed by strikes.

The 684,455,000 tons produced by anthracite and bituminous, while about 7,000,000 tons short of the government's estimate of needs, was the greatest volume of coal ever raised in the United States. Present indications seem to show that there will be little slackening in demand in 1945, but increased difficulties point to an even harder struggle to meet requirements.

During the year, the industry and the Solid Fuels Administration for War continued work on more efficient methods of distribution of coal and for conservation of manpower. The start of 1945, bringing with it predictions of sizable deficits for the year, forecast the need for even closer cooperation between the industry and government agencies in the fields of distribution, conservation of fuel and retention of present manpower. The Mining Division of the War Production Board made equipment and material available in the necessary volume during the year and here, too, the picture for 1945 was one of expected heavier demands for machinery to supplement declining manpower.

Prominent in the list of events in the fields of government and labor relations last year were these:

Completion of wage contracts for the entire industry after the War Labor Board granted its long-withheld approval.

Return of all mines except those of the Jewell Ridge Coal Corp. to private ownership by Secretary Ickes on June 21, seven months after the second government seizure.

A campaign to organize supervisory mine employees, resulting in the seizure, at one time or another, of more than 60 mines by the government.

New Demands Listed

Notification by the U.M.W. that it will demand inclusion of supervisory employees in the new wage agreements, as well as union-made tools and union-made explosives, and that it will not consider as a breach of contract any strike by miners to prevent coal being shipped to consumers whose employees are on strike. No specific wage demands were offered and the question of what increase would be asked was left to the discretion of the union's representatives. Reports were that up to $2 a day would be asked.

Continued loss of manpower, bringing the anthracite and bituminous total to a new low of around 475,000, despite special consideration from the War Manpower Commission and Selective Service.

Ruling by the Circuit Court of Appeals in the Jewell Ridge case that travel time is work time and Jewell Ridge's appeal to the Supreme Court, which had already agreed with the lower court in the iron ore mines case.

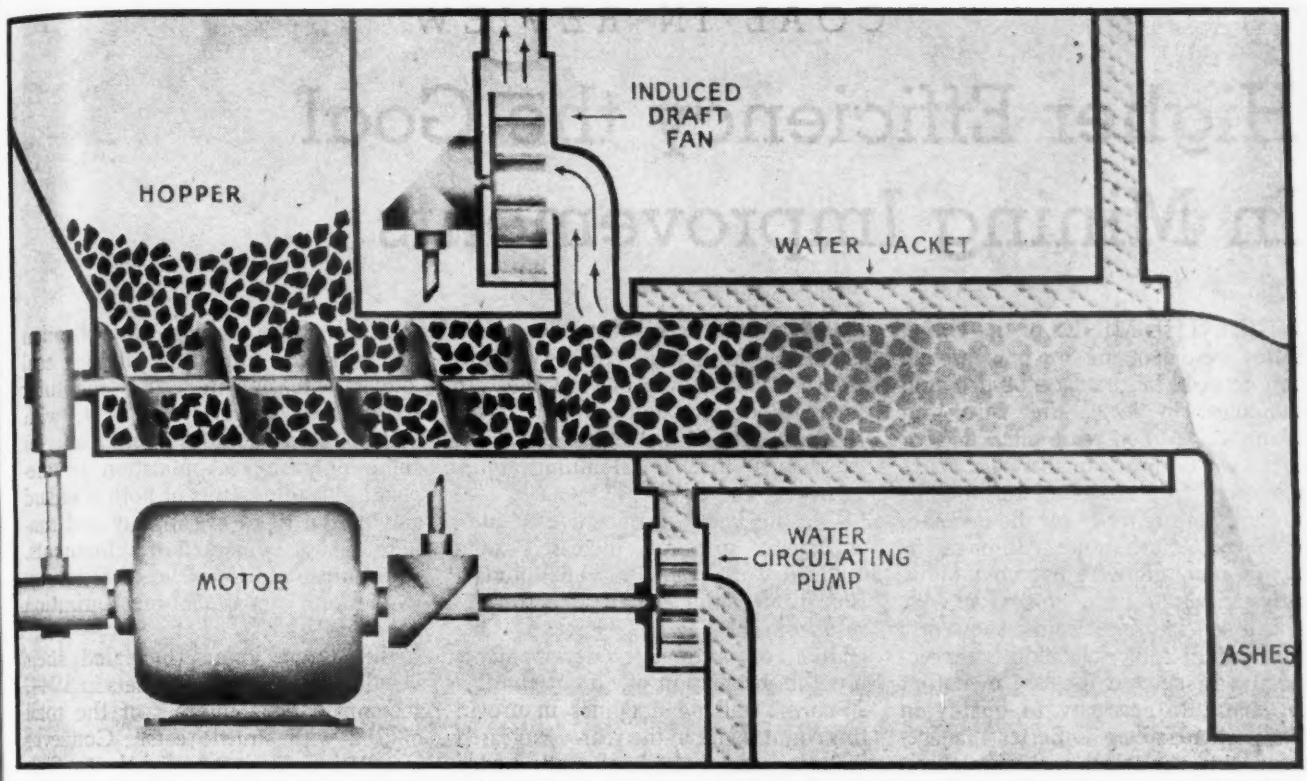
Failure of Congress to consider a new National Coal Act despite President Roosevelt's indorsement of such legislation.

Levying by a federal court of fines totaling $61,000 against 28 anthracite operators for price fixing, despite the court's expressed belief that the public interest had not suffered.

Continuation of wildcat strikes and the loss of an estimated 1,612,378 man-days through unauthorized work stoppages.

Bituminous production in 1944 is estimated at 620,000,000 tons, a new record, although 6,000,000 short of the goal of 626,000,000. The 1944 output was an increase of 5.1 percent over the total of 590,177,069 tons in 1943. Production in 1942 also set a new record up to that time of 582,692,937 tons. Anthracite eclipsed its 1943 production of 60,643,000 tons by 6.3 percent, turning out 64,455,000 tons in 1944, the largest output since 1930, when the total was more than 69,000,000 tons.

Even in the face of decreasing manpower, a look at events in 1945 justifies the conclusion that the over-all goal, high as it was, would have been met and perhaps exceeded had it not been for tonnages lost through sporadic work stoppages occasioned in large measure by efforts to organize



ANTHRACITE CHAMPION OF THE FUTURE—A product of research, this new anthracite heating unit will materially improve the industry's competitive position in the peacetime future to come.

supervisory workers. SFAW estimates that at least 7,200,000 tons of bituminous and 1,027,541 tons of anthracite were lost during the year by work stoppages. SFAW reported 1,348 individual strikes in bituminous and 104 in anthracite.

The supervisory union campaign was slow to start but once under way it spread rapidly. Although Alabama was the scene of perhaps the first supervisory strike of 1944, the brunt of the campaign was felt by mines in the North, and late in June, the National Labor Relations Board, basing its opinion on the so-called Maryland Drydock case, dismissed a petition by District 50 to certify its supervisory union as the collective bargaining agency for the foremen of the Rochester & Pittsburgh Coal Co.

However, District 50 continued its organization campaign and in August, eight R. & P. mines and two of the Ford Collieries, Curtisville, Pa., were struck and seized by the government. On Aug. 23, District 50 made known that it had asked certification to the War Labor Board of 69 representative cases in Pennsylvania, West Virginia and Kentucky.

Finally, on Sept. 16, WLB named a panel of three to hear the dispute. Those hearings were continuing at the end of 1944. SFAW estimated that at the height of the trouble strikes had cost 300,000 tons of coal in one week. Presumably by design, mines producing scarce metallurgical and special-purpose coal bore the brunt of supervisory union's efforts.

Second Seizure Ends

Completion of wage agreements for all the industry and the restoration of the mines to private ownership came as something of an anti-climax in 1944 after the bitter struggles and two government seizures of the year previous. All but the southern operators had signed the Lewis-Ickes agreement in 1943, but WLB withheld its approval until the President's special committee on travel time could make its report. That committee, in its final report May 25, put average travel time at 57.29 minutes compared to the 45 minutes in the contract. WLB, however, elected to ignore this discrepancy and approved the bituminous agreement by a vote of 10 to 2. Ickes returned all but the southern mines soon thereafter. The southern operators signed June 16, the same day that U.M.W. met in Hazleton, Pa., to ratify the anthracite agreement, approved April 7 by WLB.

The industry continued to be plagued by manpower problems during 1944 but won some help at least from the government. Early in the spring, SFAW, alarmed by the continued drain of miners for the armed forces, reached an agreement with the War Manpower Commission and Selective Service whereby miners regarded by their employees as essential would be given a 90-day deferment. A further stay was granted last June, but by then most miners were covered by the Selective Service policy of not taking men over 26 engaged in essential industry.

Most jobs in coal mining were placed in the "critical" category in January, 1945, thereby giving the industry at least a preference rating in retaining men from 26 to 30 under new draft regulations.

Activity looking to passage of a new Bituminous Coal Act continued during 1944 but the 78th Congress adjourned in December without taking action. President Roosevelt even took a hand, writing Rep. John Flannagan of Virginia that he was in favor of the act and lending his support to including a plank favoring such legislation in the Democratic platform. Opening of the 79th Congress this January brought a flood of new bills.

As one of its final acts of the year, the Senate refused to enact a rider to the rivers and harbors bill by Senator Aiken (R., Vt.) to authorize consideration of the St. Lawrence seaway plan as a treaty rather than as a matter of joint congressional legislation, despite an appeal from the White House for action on the subject.

COAL IN REVIEW

Higher Efficiency the Goal In Mining Improvements

WHILE THE MINES of the United States were hanging up new production records in the face of declining manpower in 1944, they also were taking steps to increase efficiency, reduce cost, improve quality and otherwise prepare for the job of finishing the war and getting ready for the demands of the peacetime future. Although the reports naturally were not unanimous, early arriving entries for Coal Age "Coal-for-Victory" awards showed a substantial number reaching or exceeding the 10 percent increase in output per manshift necessary to qualify in this particular class. Better management, better relations with employees, mechanical-mining equipment and better utilization of producing facilities, with an admixture of fighting spirit, were among the outstanding reasons.

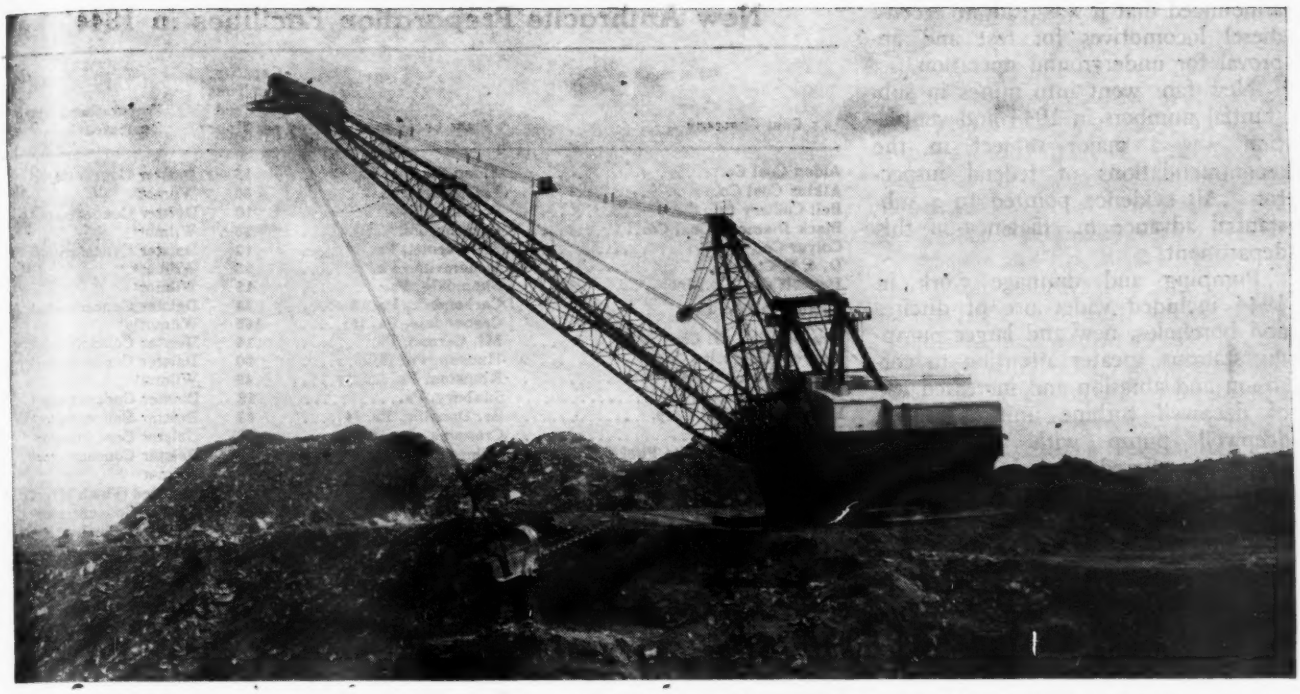
Coal mining was helped materially in producing its record tonnage by the installation of a goodly number of mechanical loading units (p. 104) and by even greater activity in stripping. In fact, although the numbers were fewer, the Bureau of Mines reported that the capacity of mechanical-mining equipment was ahead of 1943.

On the basis of Bureau estimates, anthracite stripping increased from 14.8 to 16.1 percent, while production from culm banks and dredges rose from 14.7 to 17.7 percent. One feature of anthracite developments was the installation of one of the few 25-cu.yd. walking draglines in use in this country late in the year. Increased stripping and culm-bank and dredge production naturally reduced the hand-loaded percentage. It also, despite the addition of 128 conveyors, 19 scrapers and four mobile loaders, reduced the percentage of mechanically loaded deep output from 24.3 to 22.8.

Study of the problem of application of mechanical mining to pitching coal and its extension in second and third mining was stressed in 1944, with additional installations being made for these purposes. Application of mechanical-loading units of both standard and special types in gangway and tunnel rock also marked developments. The Bureau of Mines lent its assistance in the form of a special mechanization engineer.

Bituminous mines increased their installations of mobile loaders in 1944, accompanying a number of the total of 282 with shuttle cars. Conveyor installations dropped slightly to 580, with self-loading types again comprising a substantial proportion. Under the impetus of these additions, the percentage of the output mechanically loaded, according to the Bureau of Mines, rose from 42.3 in 1943 to an estimated 42.8 percent in 1944.

Commemorating a war hero, this new mine, one of several opened in 1944 to replace worked-out operations, will supply coal for war and for the peacetime future. It is expected to furnish over 10,000,000 man-days of work in the next 50 years.



Bigger walking draglines mark stripping developments in 1944. This 25-cu.yd. walker is doing its share to boost anthracite production.

Activity in supplementary and auxiliary equipment paralleled that in loaders and conveyors. More and more units, such as cutters and drills, were placed on rubber tires or crawlers, and this principle was extended even further to conveyors at one operation, where units in moving are driven and steered like an automobile (January, 1945, *Coal Age*, p. 92). Face preparation also was distinguished by wider use of alloy and tipped bits, and at least one new type promising great increases in output was introduced into a number of mines in 1944.

Transportation development included new trolley, cable-reel and battery locomotives, with belt conveyors going into additional operations, usually in room territories, but in a few cases for main-line work. The belt conveyor also registered major gains in slope work. The majority of new mines opened in cover not too thick were equipped with slopes driven by loading machines or conveyors for hoisting. Skips and cages —some overturning—shared the honors at the few new shaft operations.

Handling supplies in conveyor sections was marked by an increase in use of the "dead-pan" method in shaker properties. When a room is driven approximately 100 ft., the live-pan line is paralleled by a "dead" line with each pan loaded with cradles, timbers, etc. When a pan is needed at the face, it is taken off the dead line, which then is pulled forward a pan length. A new pan then is coupled on at the room neck and in turn is loaded with supplies.

Haulage behind mobile loaders was marked by additional installations of conveyors and shuttle cars, including several units with capacities of 10 tons or more and an increasing number for operation on fairly substantial grades. Big, new, low-maintenance cars were chosen by many operators to improve haulage efficiency, many of them feeding to underground transfer stations. A hydraulic station made its appearance in 1944, in addition to new stations of the conventional type.

Activity in new cars was paralleled by many improvements in track—heavier rail, steel and steel-and-wood ties, treated wood ties, new dumping installations and auxiliaries. Prefabricated track layouts, cut, designed and marked for complete sections, made their debut in 1944 and were credited with a substantial increase in track-mounted loader output (January, 1945, *Coal Age*, p. 89).

New dumping installations included a two-unit rotary installation at one property with scale and feeder. A one-car dump for rock is followed by a two-car unit for coal.

Another type of transportation—truck haulage on the surface—also was marked by development of new dumping methods, permitting use of flat-bed trucks—more plentiful and cheaper—instead of the conventional end-dump type. Methods included dumps similar to the horn type (March, 1944, *Coal Age*, p. 82), and ramps and hoist-operated tilting platforms (January, 1945, *Coal Age*, p. 82).

Portal-to-portal considerations were reflected in a number of new drift and shaft openings and other rearrangements of man-trip operation, including increasing installation of special man-trip cars (March, 1944, *Coal Age*, p. 67). A number of the new shafts also were equipped with cages and hoisting equipment for more convenient handling of materials and hoisting and disposal of mine rock.

A substantial increase in rectifier installations marked power developments in 1945. The majority were of the sealed-tube type and portable units also continued in favor. Some of the original sealed-tube units have been in service 5½ years. A number of new installations were accompanied by air-cooled transformers and interest in these increased, along with an increase in number of non-inflammable liquid-cooled units for underground service.

Improved lighter-weight junction boxes for conveyor mining were among the electrical developments of 1944, which also included glass-fiber cable hangers stated to possess high strength durability and resistance to moisture.

Cable continued to be a major factor in powering underground equipment, with a number of operators reporting difficulties because new synthetic rubber jackets were supporting combustion in cases of blow-ups, and thus were increasing the fire hazard. New non-burning types were reported ready for installation, and in the meantime operators concentrated on tighter inspection and maintenance.

Steps also were taken in 1944 looking to an eventual reduction in electric power in coal mining. Toward the end of the year the Bureau of Mines

announced that it was ready to receive diesel locomotives for test and approval for underground operation.

New fans went into mines in substantial numbers in 1944 and ventilation was a major subject in the recommendations of federal inspectors. All evidence pointed to a substantial advance in efficiency in this department.

Pumping and drainage work in 1944 included wider use of ditches and boreholes, new and larger pumping stations, greater attention to corrosion and abrasion and increased use of deepwell turbine units. A new deepwell pump with submersible motor was offered the industry.

Developments in auxiliary equipment included making compressors, rock dusters and service trucks self-propelling and large enough and powerful enough to move supply cars and switch coal cars out of the way when necessary.

Maintenance Improved

Maintenance received increased attention in 1945 as a means of keeping equipment fit for the production pace set for it, although a scarcity of skilled men constituted a real problem. Some new wrinkles were developed or offered, including use of a drill motor to move a stranded loading machine (December, 1944, *Coal Age*, p. 122), fluid drives for scraper hoists, steel disks to protect shuttle-car sidewalls and increased use of metallizing. Shops were improved and added to, and lubrication received increasing attention. There was an increase in factory-built standardized grease trucks available for use.

An increase in outcrop stripping in the East and greater production from the older fields of the Middle West and Southwest marked stripping developments in 1944. The East, however, also got a share of the big equipment with a 35-yd. shovel going into eastern Ohio in addition to a 25-yd. walking dragline in the anthracite region. The percentage of coal mined by stripping increased from 13.5 percent in 1943 to an estimated 15.3 percent in the bituminous industry, and from 14.8 to 16.1 percent in anthracite.

In addition to the 25-yd. anthracite dragline, machines of this capacity also firmly established themselves in the bituminous industry with several installations. These reflected, among other things, increasing depth of overburden at many plants, resulting in tandem operation or a switch to large draglines instead of shovels. A new tool for knocking down heavy over-

New Anthracite Preparation Facilities in 1944*

Coal Company	Plant Location	Capacity, Net Tons of Feed per Hour	Preparation Equipment
Alden Coal Co.	Alden Station, Pa. (2)	13	Deister Concentrator[1]
Atkins Coal Co.	Frackville, Pa. (2)	30	Wilmot[2]
Bell Colliery Co.	Scranton, Pa.	10	Deister Concentrator[1]
Black Diamond Coal Co.	Luzerne, Pa.	20	Wilmot[2]
Colyar Co.	Mt. Carmel, Pa.	12	Deister Concentrator[1]
D. & F. Coal Co.	Minersville, Pa. (2)	95	Wilmot[2]
Dancott Coal Co., Inc.	Shamokin, Pa.	15	Wilmot[2]
DeAngelis Coal Co.	Carbondale, Pa. (5)	38	Deister Concentrator[1]
	Carbondale, Pa. (5)	155	Wilmot[2]
Dragondale Coal Corp.	Mt. Carmel, Pa.	14	Deister Concentrator[1]
Duryea Anthracite Co.	Hudson, Pa. (2)	20	Deister Concentrator[1]
Glen Alden Coal Co.	Kingston, Pa.	40	Wilmot[4]
Herrold, N. E.	Sunbury, Pa.	12	Deister Concentrator[1]
Heyden Chemical Corp.	So. Danville, Pa. (4)	32	Deister Concentrator[1]
Hoover Coal Co.	Cressona, Pa. (3)	30	Deister Concentrator[1]
Hydrotated Anthracite Fuel Co.	Milnesville, Pa.	40	Deister Concentrator[4]
Jeddo-Highland Coal Co.	Jeddo, Pa. (3)	225	Wilmot[2]
Jermyn-Green Coal Co. (No. 14)	Pittston, Pa. (2)	52	Menzies (Finch Mfg. Co.)[5]
Jonathan Coal Mining Co.	Dornsife, Pa.	12	Deister Concentrater[1]
Jones Coal Corp.	Middleport, Pa.	22	Menzies (Finch Mfg.Co.)[5]
Legal Coal Co.	Hegins, Pa. (3)	60	Wilmot[2]
Lehigh Navigation Coal Co.	Lansford, Pa. (2)	70	Wilmot[2]
Live Oak Coal Co.	Minersville, Pa. (2)	40	Wilmot[2]
Lohb Coal Co.	Schuylkill Haven, Pa (2)	27	Deister Concentrator[1]
Moore, A. J.	Schuylkill Haven, Pa.	8	Deister Concentrator[1]
Morea-New Boston Breaker Corp.	Morea Colliery, Pa. (2)	30	Deister Machine[7]
Morgan Coal Co.	Old Forge, Pa.	70	Menzies (Finch Mfg. Co.)[5]
Necho Coal Co.	Tremont, Pa. (6)	84	Deister Concentrator[1]
Nerve Coal Co.	Throop, Pa.	12	Deister Concentrator[1]
Northwest Coal Co.	Eynon, Pa. (2)	24	Menzies (Finch Mfg. Co.)[5]
Oak Ridge Mining Co.	Raven Run, Pa. (2)	140	Menzies (Finch Mfg. Co.)[5]
Peifer, C. M.	Dornsife, Pa.	8	Deister Concentrator[1]
Phoenix Coal Co.	Pottsville, Pa. (3)	45	Deister Machine[7]
	Llewellyn, Pa.	15	Deister Machine[7]
Ryon Coal Co.	Pottsville, Pa.	8	Deister Concentrator[1]
	Pottsville, Pa. (2)	30	Deister Machine[7]
	Pottsville, Pa. (2)	60	Wilmot[2]
Sandy Run Miners & Producers, Inc.	Upper Lehigh, Pa. (2)	20	Deister Concentrator[1]
Shoener, William B.	Auburn, Pa.	8	Deister Concentrator[1]
Sims Coal Co.	Frackville, Pa.	15	Wilmot[2]
South Tamaqua Coal Pockets	So. Tamaqua, Pa. (3)	42	Deister Concentrator[1]
	So. Tamaqua, Pa.	20	Wilmot[2]
Standard Preparation Co.	Moosic, Pa.	22	Menzies (Finch Mfg. Co.)[5]
Stevens Coal Co.	Tremont, Pa.	45	Wilmot[2]
Susquehanna Collieries Co.	Glen Lyon, Pa. (2)	60	Wilmot[2]
Waddell Coal Mining Co.	Winton, Pa. (3)	30	Deister Concentrator[1]
Williams Stripping Co.	Schuylkill Haven, Pa.	20	Wilmot[2]
Winton Coal Co.	So. Tamaqua, Pa.	15	Deister Machine[7]

*Includes contracts for installation of preparation equipment in existing structures. Where more than one unit of preparation equipment was installed, the number appears in parentheses after the plant address.

[1] "SuperDuty Diagonal-Deck" No. 7 coal-washing tables. [2]Wilmot Simplex jigs. [3]Hydrotator coal-cleaning equipment. [4]Wilmot hydro-separator coal-washing equipment. [5]Concenco revolving feed distributor.

[6]Menzies cone separator coal-cleaning equipment. [7]No. 16 Deister "Plat-O" coal-washing tables.

New Bituminous Preparation Facilities in 1944*

Coal Company	Plant Location	Capacity, Net Tons of Feed per Hour	Preparation Equipment
Amherst Coal Co.	Amherstdale, W. Va.	300	Link-Belt
Canyon Coal & Coke Co.	Canyon, W. Va.	200	Jeffrey
Chafin-Jones-Heatherman Coal Co.	Peach Creek, W. Va.	170	Jeffrey[1]
		185	Kanawha[1]
Chicago, Wilmington & Franklin Coal Co.	West Frankfort, Ill.	...	Allen & Garcia[2]
Columbia Steel Co.	Horse Canyon, Utah.	...	Allen & Garcia[2]
Consolidation Coal Co.	Shinnston, W. Va.	500	Fairmont[4]
	Josephine, W. Va.	350	Fairmont[5]
	Jenkins, Ky.	100	Fairmont[6]
Crab Orchard Improvement Co.	Eccles, W. Va.	35	Kanawha[7]
Fairview Collieries Corp.	Fairview, Ill.	50	McNally-Pittsburg[8]
Feds Creek Coal Co.	Harman, Va.	500	Roberts & Schaefer
Frick Coke Co., H. C.	Robena, Pa.	2,800	Link-Belt[9]
Gaston Coal Co.	Alpoca, W. Va.	200	McNally-Pittsburg[10]
Gay Coal & Coke Co.	Mt. Gay, W. Va.	40	Roberts & Schaefer[11]
Gunn-Quealy Coal Co.	Quealy, Wyo.	200	Allen & Garcia[12]
Hanna Coal Co.	Georgetown, Ohio	200	Allen & Garcia
	Piney Fork, Ohio	35	Cent. & Mech. Ind.[13]
Harbaugh Coal Co.	Madison, Pa. (2)	120	Deister Machine[14]
Homestead Coal Co.	Earlington, Ky.	250	McNally-Pittsburg
Island Creek Coal Co. (No. 15)	Verdunville, W. Va.	150	Roberts & Schaefer[15]
Island Creek Coal Co. (No. 16)	Verdunville, W. Va.	150	Roberts & Schaefer[15]

J. & W. Coal Co.	Appleton City, Mo.	75	United Iron Works[14]
Jacobs Fork Pocahontas Coal Co.	Squire, W. Va.	50	Fairmont[17]
Johnstown Coal & Coke Co.	Vindex, Md.	70	Kanawha[18]
	Portage, Pa.	60	Kanawha[18]
	Panther Creek, W. Va.	400	Kanawha
Kelleys Creek Colliery Co.	Hugheston, W. Va.	200	Kanawha
Knott Coal Corp.	Anco, Ky.	80	Roberts & Schaefer[19]
Lando Coal Corp.	Lando Mines, W. Va.	150	Jeffrey
Leckie Smokeless Coal Co.	Anjean, W. Va.	50	Kanawha[18]
Lillybrook Coal Co.	Abney, W. Va.	125	Kanawha[20]
	Killarney, W. Va.	50	Roberts & Schaefer[11]
Lightning Creek Coal Co.	Monmouth, Kan.	100	United Iron Works
Little Sister Coal Corp.	St. David, Ill.	22	Cent. & Mech. Ind.[13]
Majestic Collieries Co.	Majestic, Ky.	125	Roberts & Schaefer[11]
Marigold Coal Mining Co.	Jasper, Ala.	275	McNally-Pittsburg[21]
Montana Coal & Iron Co.	Washoe, Mont.	125	McNally-Pittsburg[21]
		60	Jeffrey[22]
Morris Run Coal Mining Co.	Morris Run, Pa.	50	Roberts & Schaefer[11]
Mt. Pleasant Mining Co.	Terre Haute, Ind.	60	Deister Machine[14]
New River Co.	Mt. Hope, W. Va.	300	Kanawha[23]
		230	Jeffrey[22]
North Side Coal Co.	Belleville, Ill.	15	Deister Concentrator[24]
Northwestern Illinois Coal Corp.	Morris, Ill.	150	McNally-Pittsburg[25]
Panther Coal Co.	Roseann, Va. (3)	140	Kanawha[18]
Paris Purity Coal Co.	Coaldale, Ark.	100	United Iron Works[16]
Pau Mau Coal Co.	Madisonville, Ky.	400	McNally-Pittsburg
Phelps Dodge Corp.	Dawson, N. M.	300	Link-Belt[26]
Pittsburgh Coal Co.	Courtney, Pa.	1,200	Link-Belt
Powellton Coal Co.	Mallory, W. Va.	250	Kanawha[27]
Princess Dorothy Coal Co.	Van, W. Va.	300	Kanawha
Rail & River Coal Co.	Bellaire, Ohio	60	Jeffrey[22]
Raleigh Coal & Coke Co. (No. 6)	Raleigh, W. Va.	275	Jeffrey
Red Jacket Coal Corp.	Red Jacket, W. Va.	350	Morrow[29]
		300	Link-Belt[29]
Red Lands Coal Co.	Red Lands, Pa.	70	Roberts & Schaefer[11]
Republic Steel Corp.	Virginia City, Ala.	150	Fairmont[30]
	Pikeville, Ky.	50	Fairmont[31]
Rochester & Pittsburgh Coal Co.	McIntyre, Pa.	12	Cent. & Mech. Ind.[13]
St. Louis, Rocky Mountain & Pacific Co.	Raton, N. M.	250	Jeffrey[32]
Semple Coal Co., C. Y.	Coalgate, Okla.	75	United Iron Works
Shasta Coal Co.	Bicknell, Ind.	400	McNally-Pittsburg[33]
Terteling & Sons, J. A.	Hanna, Wyo.	100	McNally-Pittsburg
Truax-Traer Coal Co.	Hazen, N. D.	500	Link-Belt
Victory Coal Co.	Mineral, Kan.	75	United Iron Works
West Kentucky Coal Co.	Earlington, Ky.	170	Roberts & Schaefer[19]
	Earlington, Ky.	22	Cent. & Mech. Ind.[13]
West Virginia Coal & Coke Corp.	Stirrat, W. Va. (7)	800	Fairmont[34]
	Omar, W. Va.	125	Jeffrey
Winding Gulf Collieries	Goodwill, W. Va.	40	Kanawha[18]
Woodward Iron Co.	Woodward, Ala.	15	Deister Machine[35]

[1]Includes additions and installations of preparation equipment in existing structures. Where information indicated that more than one preparation unit was installed, the number appears in parentheses after the plant address.

[2]Coal-washing plant by Kanawha, 185 t.p.h. diaphragm jig., 170 t.p.h. by Jeffrey. [3]Coal-washing plant in process of design. [4]Contract for mine and preparation plant, including 5,000-ton-capacity blending-bin tipple completed in 1944; over-all plant capacity, 8,500 tons per day. [5]Addition to No. 32 plant. [6]New plant, Mine No. 98.

[7]Addition to Mine 207 plant to permit change of 3/8 × ¼-in. from one type of cleaning equipment to another. [8]Refuse re-treatment, including Kanawha-Belknap chloride washer. [9]McNally-Rheo fine-coal plant for ½ mm. × 0, including Carpenter centrifugal dryer. [10]Includes Bradford breaker, screening and picking equipment, river bins and barge-loading equipment. [11]Includes McNally-Norton automatic washing equipment.

[12]Stump Air-Flow cleaning equipment. [13]Used tipple moved from Illinois and rebuilt. [14]"C-M-I" continuous centrifugal drying equipment. [15]Deister "Plat-O" vibrating screen installation. [16]Combination wet-and-dry cleaning plant, including R&S hydroseparator and Stump Air-Flow cleaning equipment.

[17]Including O. R. C.-type jig washer. [18]American pneumatic separator equipment. [19]Kanawha-Belknap chloride washing plant. [20]R&S hydroseparator washing equipment. [21]Tipple with Kanawha-Belknap chloride washer.

[22]McNally-Norton automatic washer and auxiliaries. [23]Diaphragm-jig equipment. [24]Strip- and deep-mine plant, including 230-t.p.h. diaphragm jig. [25]"SuperDuty Diagonal-Deck" No. 7 coal-washing table. [26]New plant, including McNally-Norton automatic washer, 150 t.p.h.

[27]Washing plant including air-pulsated jig. [28]Preparation plant, including washing and sludge-recovery facilities. [29]Unit washer. [30]Preparation plant by Morrow, 350 t.p.h., with Link-Belt air-pulsated jig, 300 t.p.h. [31]Chance sand-flotation plant.

[32]Facilities for air-cleaning plant. [33]Washing plant. [34]Washing plant addition, including McNally-Norton compound washing system. [35]Dorrance colliery central cleaning plant, including two Chance cones and five American "Twin-Dex" pneumatic separators. [36]No. 16 Deister "Plat-O" coal-washing table.

burden introduced during the year was the wheel excavator, operating in the Fulton County district of Illinois. Wire rope replaced rigid boom supports on several shovels.

New and larger haulage units, with diesel power predominating, featured transportation developments, along with increased attention to roads and grades. Several additional diesel-electric locomotives went into rail haulage from the pit.

In the electrical field in stripping, unit substations—simple, self-contained, easily moved and safe—made major strides.

Long moves of both shovels and, in some cases, the preparation plants, marked stripping developments in the Middle West and Southwest. Moving shovels up to 10 miles or more was not uncommon and cutting haulage distance was found to warrant re-erecting the preparation plant in at least one instance.

The year 1944 was an active one in the coal-preparation front, with installations of new plants and equipment apparently increased over 1943. The smaller sizes got the bulk of the attention in both the anthracite and bituminous industries. In anthracite, a large part of the new installations of equipment were for beneficiating pea, buckwheat and smaller, with a number of washers and jigs for the larger.

Interest in salvaging and cleaning silt, spurred on by agitation on stream pollution, increased in 1944, with one company embarking on construction of a regular production plant for this purpose. A number of others were storing the extreme fines against possible erection of plants for their beneficiation and utilization, including briquetting.

Fine Coal Recovered

Slurry recovery and beneficiation also was advanced in the bituminous industry through the erection of a number of plants for this purpose, using various types of washing, classifying, centrifugal and other equipment. In consequence pumping the product, either in course of processing or as a means of storing or disposing of it, received greater attention, also spurred on by pollution activity in many regions.

Several very large preparation plants were erected or started in 1944 in the bituminous industry. Many individual cleaners were installed for single sizes or, more often, for the finer grades. In many cases, preliminary mine-run installations foreshadowed large new plants at a later date when materials become available. Tightness in materials, in fact, forced deferment of plans for a number of new plants for the mechanical preparation of coal. Greater interest in the salvaging of coal values by treating mine rock and recleaning pickings and washer reject were reflected in additional installations.

Additional mine-run blending installations included at least one more large underground plant at one operation. Blending of the cleaned product also was marked by increased adoption of the necessary breaking, storage and feeding units.

Tipple installations included a number of the simpler and more readily moved type for serving outcrop strippings in the East and South.

Developments in disposal of mine rock and preparation-plant refuse included more crushing and handling facilities prior to delivery to the disposal medium, as well as additional installations for pumping reject, after crushing, to the disposal site.

Sales of Mechanical Loading and Cleaning Equipment

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UNITS of underground mechanical-loading equipment sold in the United States for use in bituminous coal, anthracite and lignite mines were less in number in 1944 than in 1943. In terms of capacity, however, the 1944 sales were 4.4 percent greater than in 1943.

Capacity of mechanical-cleaning equipment installed at bituminous mines was 55 percent more in 1944.

This survey was made possible by the courteous cooperation of all known manufacturers of mechanical loading and cleaning equipment in the United States, supplemented by data from various trade journals.

Mechanical loading of underground bituminous coal and lignite increased from 40.0 percent of the total output in 1942 to 42.3 percent in 1943 and 42.8 percent (estimated) in 1944.

Mechanical cleaning of bituminous coal increased from 24.4 percent of the total output in 1942 to 24.7 percent in 1943. During 1944 it is estimated that 150,000,000 tons of cleaned coal was produced, or 24.2 percent of the total bituminous output. There are no mechanical-cleaning plants at lignite mines.

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Underground mechanical loading in Pennsylvania anthracite mines decreased from 24.5 percent of the total output in 1942 to 24.3 and 22.8 percent in 1943 and 1944, respectively.

Table I shows bituminous-coal and lignite production by methods of mining and mechanical cleaning for the years 1942-44, inclusive. Pennsylvania anthracite production by methods of mining for the same years is given in Table II.

Total Units Sold by Type—Units of mechanical-loading equipment sold for use in underground bituminous-coal, anthracite and lignite mines, as reported by manufacturers for the years 1937-44, inclusive, are shown in Table III.

Sales of mobile loaders increased from 234 in 1943 to 286 in 1944, or 22.2 percent. There were 39 scraper units sold in 1944, which equals the number sold in 1940. This record of 39 sales has not been surpassed since 1933 when 65 units were sold.

Conveyor sales were 708 in 1944 compared with 1,100 in 1943, a decrease of 35.6 percent. There were no pit-car loaders sold in 1944. During the past six years, 1939-44, inclusive, there were only 18 pit-car loaders sold.

Regional Distribution of Sales—Table V shows the total number of units of mechanical-loading equipment shipped to the various States and regions during 1944. Types of equipment sold in approximate order of capacity are shown by letter symbol. For example, 160 mechanical-loading units were sold in Pennsylvania. In this total number of units sold, mobile-loading machines (indicated by "L") furnished the largest addition to capacity, followed by conveyors ("C") and scrapers ("S"). Capacities are based on actual performances as reported in 1943 by mine operators. In this aggregate of new equipment sold, mobile loaders furnished the greatest added capacity, with conveyors and scrapers following in the order named.

A total of 882 mechanical-loading units were shipped to the bituminous-coal and lignite mines and 151 to Pennsylvania anthracite mines in 1944. In terms of capacity the sales of mechanical-loading equipment for bituminous and lignite mines increased 6 percent in 1944 over the previous year, while sales for use in anthracite mines decreased 35 percent during the same period.

In addition to the total of 1,033 units of mechanical-loading equipment sold for use in coal mines in the United States, a few units were shipped to foreign countries during 1944.

Types of Machines Sold Compared With Units in Use—The change in demand for different types of mechanical-loading equipment is shown in Table V. The number of mobile loaders in active use increased from 657 in 1935 to 2,525 in 1943. During 1944 there were 282 mobile loaders sold, or 11 percent of the total number in use in 1943.

Scraper units in use showed little change during the nine-year period, increasing from 78 in 1935 to 131 in 1939 and then decreasing to 83 in

Table I—Bituminous Coal and Lignite Production in the United States by Methods of Mining and Mechanical Cleaning, 1942-44, Inclusive

	1942		1943		1944*	
	Thousands of Net Tons	Percent of Total	Thousands of Net Tons	Percent of Total	Thousands of Net Tons	Percent of Total
Surface stripping	67,203	11.5	79,685	13.5	95,000	15.3
Hand loaded underground	282,587	48.5	260,687	44.2	260,000	41.9
Mechanically loaded underground	232,903	40.0	249,805	42.3	265,000	42.8
Total production	582,693	100.0	590,177	100.0	620,000	100.0
Mechanically cleaned	142,187	24.4	145,576	24.7	150,000	24.2

* Preliminary.

Table II—Pennsylvania Anthracite Production by Methods of Mining, 1942-44, Inclusive

	1942		1943		1944*	
	Thousands of Net Tons	Percent of Total	Thousands of Net Tons	Percent of Total	Thousands of Net Tons	Percent of Total
Surface stripping	9,071	15.0	8,989	14.8	10,356	16.1
Culm banks and dredges	6,020	10.0	8,919	14.7	11,436	17.7
Hand loaded underground	30,495	50.5	27,990	46.2	27,938	43.4
Mechanically loaded underground	14,742	24.5	14,746	24.3	14,715	22.8
Total production	60,328	100.0	60,644	100.0	64,445	100.0

* Preliminary.

1943. Sales of scraper units in 1944 amounted to 24 percent of the number in use in 1943.

Pit-car loaders are being rapidly replaced with other types of loading equipment. The number of pit-car loaders in use decreased from 2,098 in 1935 to 321 in 1943. There were no sales of pit-car loaders reported in 1944.

Conveyors equipped with duckbills or other self-loading heads increased from 179 units in active use in 1935 to 1,226 in 1943 and hand-loaded conveyors increased from 670 to 3,191 during the same period. There were 580 conveyor units sold in 1944, or 13 percent of the total number (hand-loaded and duckbills combined) in use in 1943.

The change in demand for different types of mechanical-loading equipment for use in anthracite mines also is shown in Table V. The number of scrapers has shown little change during the nine-year period 1935-43, varying from a low of 504 to a maximum of 547.

Conveyors in active use, hand-loaded and duckbills combined, increased from 1,563 in 1935 to 2,701 in 1943. The total number of units sold in 1944 was 151, or 5 percent of the total in use in 1943.

Types of Equipment Purchased by Regions—Table VI shows the number of mobile loaders, scrapers, and conveyor units shipped into the various States and groups of States in 1944 and the number of units in actual use in 1943. All of the mobile loaders except four were shipped to bituminous and lignite mines.

There were 39 scraper units sold in 1944. The bituminous mines received 20 and the anthracite 19. No scraper units were sold in 1944 for use in lignite mines.

Conveyor sales in 1944 in relation to the number in actual use in 1943 were greater in Kentucky than any other State.

West Virginia received 178, or 31 percent of the total number of con-

Table III—Units of Mechanical Loading Equipment Sold to Bituminous Coal, Anthracite and Lignite Mines for Underground Use in the United States, as Reported by Manufacturers, 1937-44, Inclusive

	1937	1938	1939	1940	1941	1942	1943	1944	Percent change, 1944 from 1943
Type of equipment:									
Mobile loaders	292	241	292	233	368	352	234	286	+ 22.2
Scrapers [1]	29	10	26	39	11	29	15	39	+160.0
Conveyors [2]	1,095	990	1,311	1,762	2,130	1,491	1,100	708	− 35.6
Pit-car loaders	32	139	2	3	10	2	1	.....	−100.0
Total, all types	1,448	1,380	1,631	2,037	2,519	1,874	1,350	1,033	− 23.5
Number of manufacturers reporting	28	29	31	32	32	28	24	22	.....

[1] Reported as scrapers or scraper haulers and hoists.

[2] Includes hand-loaded conveyors and those equipped with duckbills or other self-loading heads. Sales of both loading heads and shaker conveyors were counted for the years 1937-44, inclusive, but the figures for 1942-44, inclusive, do not include loading heads separately.

Table IV—Total Number of Units of Mechanized Loading Equipment Shipped for Use in Each State or Region in 1944

(L—Mobile loading machines; S—Scrapers; C—Conveyors)

State and Region	Number of Units of All Types Shipped in 1944	Types of Equipment in Approximate Order of Capacity in 1944
Northern Appalachian States:		
Pennsylvania	160	L.C.S.
Ohio	20	L.C.
Maryland	3	C.
Southern Appalachian States:		
West Virginia	262	L.C.S.
Virginia	31	L.C.S.
Kentucky	181	C.L.S.
Alabama	56	L.C.
Tennessee	44	C.L.
Middle Western States:		
Illinois	33	L.C.
Indiana	14	L.
Trans-Mississippi States:		
Arkansas, Oklahoma, and Missouri	16	C.L.S.
Colorado	18	C.L.
Montana and Utah	17	L.C.
New Mexico, North Dakota and Washington	11	L.C.
Wyoming	16	C.L.S.
Total bituminous and lignite	882	L.C.S.
Pennsylvania anthracite	151	C.L.S.
Grand total	1,033	L.C.S.

Table V—Sales of Mechanical Loading Equipment in 1944 Compared With Total Number of Machines in Active Use in Preceding Years

	Number of machines in active use as reported by mine operators									Number of machines sold as reported by manufacturers in 1944
	1935	1936	1937	1938	1939	1940	1941	1942	1943	
Bituminous and lignite mines:										
Mobile loading machines	657	980	.....[1]	1,405	1,573	1,720	1,985	2,301	2,525	282
Scrapers	78	106	.....[1]	117	131	116	109	93	83	20
Pit-car loaders	2,098	1,851	.....[1]	1,392	873	697	607	481	321	...
Conveyors equipped with duckbills or other self-loading heads	179	234	.....[1]	346	559	656	788	1,062	1,226	...[2]
Hand-loaded conveyors—number of units	670	936	.....[1]	1,526	1,834	2,263	2,807	3,041	3,191	580[2]
Anthracite mines (Pennsylvania):										
Mobile loading machines	1	.....[3]	.....[4]	.....[4]	.....[4]	.....[3]	.....[3]	.....[3]	.....[3]	4
Scrapers	507	504[3]	539	545	535	547[3]	505[3]	524[3]	515[3]	19
Pit-car loaders	22	.....[5]	.....[4]	.....[4]	.....[4]	.....[5]	.....[5]	.....[5]	.....[5]	...
Conveyors equipped with duckbills or other self-loading heads	30	.....[5]	.....[4]	.....[4]	.....[4]	.....[5]	.....[5]	.....[5]	.....[5]	...[2]
Hand-loaded conveyors—number of units	1,563	1,790[5]	1,855[4]	1,831[4]	1,997[4]	2,189[5]	2,432[5]	2,491[5]	2,701[5]	128[2]

[1] Data for 1937 not available for bituminous and lignite mines.

[2] Sales of conveyors equipped with duckbills or other self-loading heads are included with hand-loaded conveyors.

[3] Mobile loading machines are included with scrapers.

[4] Mobile loading machines, pit-car loaders, and conveyors equipped with duckbills or other self-loading heads are included with hand-loaded conveyors.

[5] Pit-car loaders and conveyors equipped with duckbills or other self-loading heads are included with hand-loaded conveyors.

veyor units sold to bituminous coal and lignite mines in 1944.

Trackless Gathering Equipment—Sales of rubber-tired self-powered haulage units, or shuttle cars, increased in 1944 over 1943. Deliveries were made in twelve States in 1944, with Pennsylvania receiving the largest number and West Virginia, Illinois, Kentucky and Tennessee following in order named. During 1943, 17 percent of the coal handled by mobile loaders was loaded into rubber-tired trucks and 3 percent was loaded onto conveyors for the initial phase of transportation.

Sales of Mechanical-Cleaning Equipment for Bituminous Coal—Reports on sales from 17 manufacturers of bituminous-coal-cleaning equipment show that installations were made in twelve States in 1944 as compared with ten States in 1943.

The total capacity of mechanical-cleaning equipment sold for use at bituminous-coal mines in 1944 was estimated at 5,400 net tons of cleaned coal per hour as compared with 3,500 net tons' capacity sold in 1943. Some of this equipment sold in 1944 will not be placed in operation until early in 1945. In terms of capacity, about 60 percent of the installations were made at mines that had no cleaning facilities and the other 40 percent were made as additions to or replacement of equipment at mines that already had cleaning plants. Installations in 1944 were greater in West Virginia.

Table VI—Comparison of Mobile Loading, Scrapers, and Conveyors in Actual Use in 1943 with Sales Reported in 1944, by States and Regions

State and Region	Mobile Loaders		Scrapers		Conveyors[1]	
	In Use in 1943	Sales in 1944	In Use in 1943	Sales in 1944	In Use in 1943	Sales in 1944
BITUMINOUS AND LIGNITE MINES						
Northern Appalachian States:						
Pennsylvania	536	86	7	4	880	70
Maryland	.....	....	.....	....	27	3
Ohio	163	4	.....	....	235	16
Michigan	.....	....	.....	....	5	.....
Southern Appalachian States:						
Alabama	80	12	48	....	398	44
Kentucky	184	33	.....	1	347	147
Tennessee	6	5	.....	....	126	39
West Virginia	594	76	6	8	1,242	178
Virginia	47	9	.....	3	134	19
Middle Western States:						
Illinois	567	29	.....	....	31	4
Indiana	169	14	.....	....	.....	.....
Trans-Mississippi States[2]	179	14	22	4	992	60
Total bituminous and lignite	2,525	282	83	20	4,417	580
ANTHRACITE MINES						
Pennsylvania	.....[3]	4	515[3]	19	2,701[4]	128
Grand total	2,525	286	598	39	7,118	708

[1] Includes conveyors equipped with duckbills.

[2] Includes Arkansas, Colorado, Iowa, Missouri, Montana, New Mexico, North Dakota, Oklahoma, Utah, Washington, and Wyoming.

[3] Mobile loaders included with scrapers.

[4] Includes pit-car loaders and duckbills or other self-loading conveyors.

COAL IN REVIEW

More Coal Mined in 1944 With Fewer Accidents

By W. W. ADAMS
Chief, Accident Analysis Division
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ALTHOUGH CONFRONTED with a shortage of manpower and with many other difficulties of operation in wartime, 1944 was a good year, in some ways, for the coal-mining industry of the United States. If production of coal did not climb to levels to meet all needs, it at least reached a level higher than that of any previous year in the history of the industry. And if accidents to the workers were not reduced in number to an all-time low, they were at least lowered to a figure that represented a large saving in loss of life and limb as compared with 1943.

Production of coal, according to present estimates, was 684 million short tons, of which 620 million tons was bituminous and 64 million tons was Pennsylvania anthracite. Accidents to employees resulted in the death of 1,306 men, according to tentative figures for the first eleven months of the year and an estimate for December. Of the fatalities, 1,134 were in bituminous mines in various States and 172 were in the anthracite mines of Pennsylvania.

On the basis of these figures, which are subject to such correction as may be necessary when final reports from operating companies are received, the accident record for 1944, as compared with 1943, represented the saving of 164 lives, 110 of which should be credited to bituminous mines and 54 to Pennsylvania anthracite mines. The tentative death rate per million tons of coal produced was 1.91, compared with 2.26 in 1943, a reduction of 15 percent.

Bituminous mines reported a rate of 1.83 deaths per million tons of coal mined, which compared favorably with 2.11 for the previous year. Anthracite mines in Pennsylvania, according to present reports, had a per-million-ton fatality rate of 2.69, compared with 3.80 for 1943.

The average number of men "at work" in coal mines during 1944—meaning the average number of men exposed to accident hazards, including both wage earners and salaried employees—was about 31,000 below the number working in 1943. The large increase in production of coal was accomplished by keeping the mines in operation more days during the year. An estimate indicates an increase of about 13 workdays per man in 1944 over the year before, shifts being 8 hours instead of 7, the prevailing length during most of 1943. It is believed that final reports from operating companies will show that about 463,000 men worked in 1944. The average for each man was about 282 days. Therefore, more than 130 million man-shifts were worked, totaling 1,021 million man-hours.

Major disasters—those in which five or more lives were lost—were responsible for 94 deaths at coal mines in 1944. This loss of life, which resulted from four separate accidents, indicated a marked improvement over the disaster record of 1943, which showed a loss of 175 lives in eight separate accidents. The record for 1944 included an explosion March 25 in West Virginia in which 16 men lost their lives, a mine fire June 8 in Pennsylvania in which six lives were lost, a mine fire July 5 in Ohio in which 66 men were killed and an explosion July 28 in New Mexico in which six men were killed. There were no disasters in the last five months of the year.

Falls of Roof and Coal

Always the leading cause of fatal accidents in coal mines, falls of roof or coal, in 1944 caused the deaths of 675 men—592 in bituminous mines in various States and 83 in Pennsylvania anthracite mines. These fatalities comprised 52 percent of the total number of deaths from all causes in bituminous mines and 48 percent of the total in Pennsylvania anthracite mines. Tentative figures indicate a fatality rate for this class of accidents of 0.99 per million tons of coal produced during the year, the bituminous rate being 0.95 and the anthracite rate 1.30. These rates were lower than those for 1943 by good margins.

On the basis of the estimated production of coal, the lower fatality rate for falls of roof and coal during 1944 reflected a saving of 101 lives from the number that would have been lost had the previous year's rate continued. How favorable the 0.99 rate in 1944 was may be judged by comparing it with a rate of 1.39 five years ago and 1.65 ten years ago. The last fall-of-roof accident in which five or more lives were lost occurred on July 1, 1938, when six men were killed in a mine at Praco, Ala.

Haulage

Accidents involving mine cars and locomotives underground caused 260 fatalities among coal-mine workers in 1944. Twenty-three of the fatalities occurred in anthracite mines in Pennsylvania and 237 in bituminous mines throughout the country. The haulage-accident hazard usually ranks second among the principal causes of fatal accidents in coal mines. It is displaced to third position only in years in which major gas and dust explosions occur. Twenty percent of all fatalities in 1944 were chargeable to or involved haulage equipment, the proportion being 21 percent in bituminous mines and 13 percent in anthracite.

The 260 deaths from haulage in 1944 represented a rate of 0.38 per million tons of coal produced by the entire coal-mining industry. The rate for bituminous mines was 0.38, and that for anthracite, 0.36. Five years ago the rate for haulage accidents was 0.41. Ten years ago it was 0.47. This declining fatality rate is especially creditable in the face of the increased quantities of coal handled by haulage equipment underground in the mines. The major-disaster record for underground haulage shows that the last occurred nearly 25 years ago—on July 30, 1915, in a mine at Elizabeth, Pa.

Gas and Dust Explosions

Thirty-three deaths from gas-and-dust explosions—of which 22 occurred in two major disasters—were indicated by reports to the Bureau of Mines for 1944. This record reflected a marked improvement over that of 1943, when deaths from explosions numbered 185,

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COAL-MINE FATALITIES IN THE U. S. DURING 1944*

Cause	Bituminous		Pa. Anthracite		Total	
	Number of Fatalities	Rate per Million Tons Mined	Number of Fatalities	Rate per Million Tons Mined	Number of Fatalities	Rate per Million Tons Mined
Underground:						
Falls of roof and coal	592	0.955	83	1.297	675	0.987
Haulage	237	.382	23	.359	260	.380
Explosions: Local	9	.015	2	.031	11	.016
Major	22	.035	..	....	22	.032
Explosives	17	.027	18	.281	35	.051
Electricity	35	.056	3	.047	38	.056
Machinery	39	.063	..	....	39	.057
Fires	76	.123	..	....	76	.111
Miscellaneous	19	.031	16	.250	35	.051
Total underground	1,046	1.687	145	2.265	1,191	1.741
Shaft	5	.008	6	.094	11	.016
Open-pit	29	.047	8	.125	37	.054
Surface	54	.087	13	.203	67	.098
Grand Total, 1944	1,134	1.829	172	2.687	1,306	1.909
Grand total, previous year	1,244	2.108	226	3.798	1,470	2.263
Production, 1944, tons (est.)	620,000,000		64,000,000		684,000,000	
Production, 1943, tons	590,177,069		59,505,666		649,682,735	

* Estimate from tentative reports for January to November.

of which 162 were in explosions classed as "major." The fatality rate from explosions, according to present reports, was 0.048 per million tons of coal produced during the year. Five years ago the rate was 0.103 and ten years ago it was 0.125. The number of fatalities from explosions was only 2.5 percent of the total from all causes. In 1943, the percentage was 12.6.

Much of the reduction in the overall fatality rate for the coal-mining industry in 1944 was due to the reduction in the number and severity of explosions. Although the year was marred by two major explosions, they were relatively small in the category of major disasters. The most recent explosion in which 100 or more men were killed was in 1928, when 195 lost their lives May 19 at Mather, Pa.

Explosives

Although coal mines used more than 220 million pounds of explosives during 1944, only 35 of the 1,306 deaths in that year were chargeable to their handling or use. This number does not, however, include fatalities from gas and dust explosions in which explosives may have been a contributing factor. As a direct cause of fatal accidents, explosives were responsible for a death rate of 0.051 per million tons of coal mined during 1944, the rate for soft coal mines being 0.027 and that for hard coal mines (Pennsylvania anthracite), 0.281.

In spite of the increased quantity of explosives used in coal mines during 1944, to meet the demand for more coal, the fatality rate from explosives accidents represented a gratifying reduction from the corresponding rate of five years ago (0.071) and ten years ago (0.086).

Electricity

Under this heading, in the Bureau of Mines accident reports, are included accidents in which electric current is the immediate and direct cause of injury to an employee. It does not include accidents involving mechanical or other equipment or agencies in which the injured employee did not come into contact with electric current. In 1944, fatal accidents chargeable directly to electricity caused 38 deaths among underground employees in coal mines, including 35 in bituminous mines and 3 in anthracite mines. Compared with the total number of fatal accidents from all causes, those from electricity comprised less than 3 percent.

Although electric current is increasing in importance as a source of power in coal-mining operations as miners' work becomes more and more mechanized, the rate for fatalities chargeable to electricity was lowered in 1944. The rate of 0.056 per million tons of coal produced during that year represented a decline from the rate for 1939 (0.114) and from 1934 (0.134). Although electricity has frequently been the original and indirect cause of explosions in which five or more men have been killed, the Bureau of Mines statistical records do not reveal a major disaster in which electricity was the direct and sole cause of the accident.

Machinery

Machinery used in underground mining operations—chiefly coal-cutting and coal-loading machinery—was responsible for 39 fatal accidents in 1944. This figure indicated a fatality rate of 0.057 per million tons of coal produced during the year. The number comprised about 3 percent of the total number of fatalities.

Mine Fires

Seventy-six lives were lost through fires in coal mines during 1944. Four fires occurred in each of which one man lost his life. In another, 6 lives were lost and in a third, 66 men were killed. The combined coal-mine fatality rate from all the fires was 0.111 per million tons of coal produced. All the fires were in bituminous mines, making the rate for this class of mines alone 0.123.

The fire record for 1944 was not good, as is shown by comparing the year's fatality rate of 0.111 with a rate of zero for 1939 and 0.019 for 1934. The fire on July 5 in Ohio in which 66 lives were lost was the most recent major fire in coal mines. The earliest major mine fire on record was that which killed 179 men in the Avondale mine at Plymouth, Pa., Sept. 6, 1869. It was the Avondale fire that hastened, if it did not originate, the enactment and development of State laws for the safety-inspection of coal mines.

The wartime demand for coal in the United States during 1944 led to an all-time high in the quantity produced. This feat was accomplished without increasing the cost of coal in human life. Instead, that cost was reduced. Production during 1945 must exceed the record-breaking output of 1944 if the needs of the country are to be met. That this, if accomplished, may be done without additional loss of life among the miners is shown by the creditable performance of the coal industry in 1944. Because difficulties of operation probably will not be less in 1945, increased safety precautions must keep pace with augmented output. That the coal industry is alert to this fact seems evident.

EW RIVER STRIPPING

nder Way on 75-Mile Sewell-Seam Outcrop

Four Projects Have Been Initiated—Contractors Paid per Ton of Coal and Company Inspector Is Sole Judge of Acceptable Quality—Special Tipple Built by Company to Serve One Area

By J. H. EDWARDS
Associate Editor, Coal Age

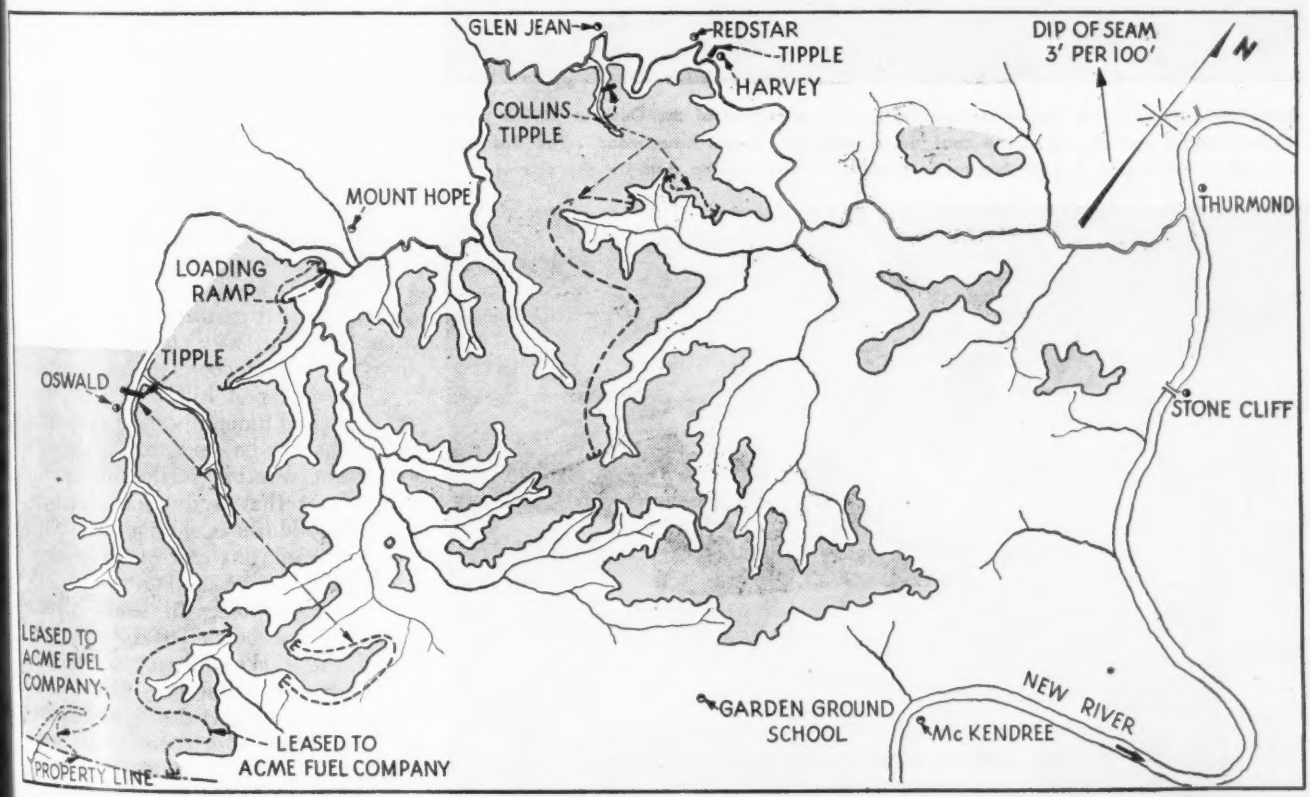
FROM ITS Sewell seam outcrop, totaling approximately 75 miles, The New River Co., Mt. Hope, W. Va., has added about 30,000 tons of low-volatile coal per month to the war effort through the medium of its strip-mine operations begun two years ago. From three projects operated by one principal contractor and his subcontractors and a fourth project operated by a neighboring coal company on lease The New River Co. receives coal at four plants or terminals for loading into railroad cars.

Not letting the present demand for its coal obscure the future, The New River Co., under leadership of L. Ebersole Gaines, president, and J. A. Hunt, vice president in charge of operations, is exercising close control over the quality of coal loaded in the pits by its agents and is preparing it with the same care that has characterized preparation of its White Oak coal from its underground mines in the same seam in Fayette and Raleigh counties for nearly 40 years.

While hilly country, cut by numerous creeks and ravines, is responsible for many miles of outcrop, the steepness of most of the hillsides reduces to about 60 ft. the average width of marketable coal that can be stripped to the usual cover depth of about 40 ft. Seam thickness of the underground mines averages 40 in. and ranges from 36 and 48 in. In many places the outcrop coal—the heart of the vein—on Dunlop Creek, is thicker, ranging from 4 to 5½ ft., and for the most part these thicker areas are the ones being stripped.

Of the 75 miles of outcrop it is expected that 50 to 60 miles will be found minable. Along the frontage, rooms and entries of mined-out areas are likely to be encountered over distances of several miles. Stripping experience over the last two years, however, has indicated that the line to which underground mining has been limited by weak top coincides somewhat closely with the line where strip mining is limited by cover of excessive thickness or hardness of rock. Consequently, there is surprisingly little tendency for stripping to overlap underground mining.

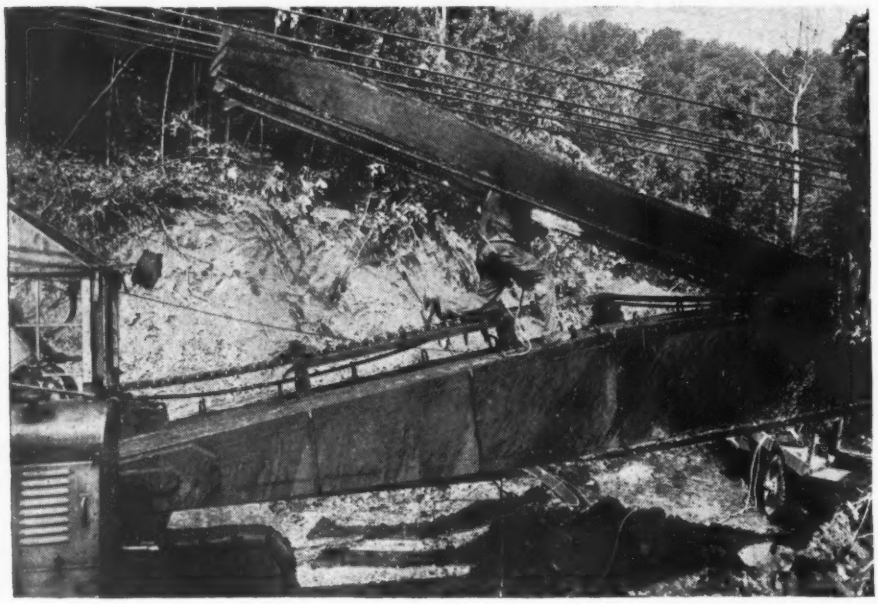
There are numerous narrow or point areas that were bypassed in the early underground mining and many miles of crop which have yet to be reached



Line of outcrop of The New River Co.'s Sewell seam. Total length is 100 miles. Brackets and heavy lines show sections being stripped.

Left: Shotholes 4½ in. in diameter and usually 40 to 50 ft. deep are made with this horizontal drill in Oswald pit. About 40 percent of the overburden requires shooting. Right: Loading a trip of underground mine cars in Oswald pit. Trips of seven or eight cars are spotted by cable-reel locomotives. The distance of the haul is 2,800 ft. outside and 2½ miles underground.

Some 2,000 tons of coal ready for loading in a new section of the Oswald pit. A mine track is being laid on top of the coal, using steel ties bolted onto wood. The dragline with 60-ft. boom and 1½-yd. bucket is rehandling overburden dug by the shovel.



Welding truck and operator arc-welding a rack breaking loose from the dipper stick.

by underground operations. To a very large extent the present strippings on The New River Co.'s property therefore are, in places, in virgin coal where old workings are not encountered and present work is not hampered by falls or water accumulations. The Sewell seam has a general dip of 3 percent 45 deg. northwest, which does make for occasional water pockets that sometimes become a source of temporary inconvenience on being suddenly opened.

The T. M. Boxley Co., former general and railroad contractor, is doing the stripping for The New River Co. Like most contractors engaged in strip mining in West Virginia, the firm had no experience in stripping prior to its present engagement. Most of its equipment is by necessity that which was available from prewar jobs. Part of it, however, is new and specially suited to the needs at hand. Shovels, draglines, wheeled scrapers and bulldozers are used.

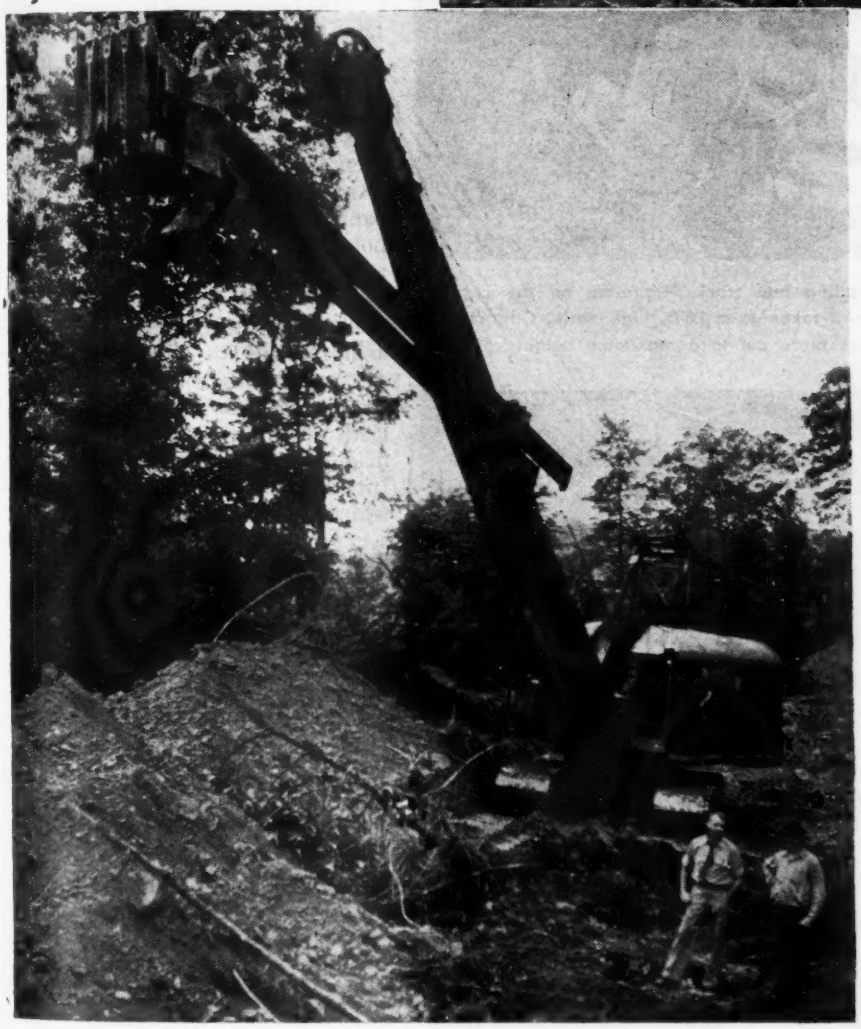
Because of the miscellany of equipment and the wide range of conditions, including character of overburden, steepness of hills and sharpness of points and indentations of crop line, it can hardly be said that a definite system of working predominates. In some cases the overburden is rehandled. A bulldozer may be used to push over the bank dirt cast by a shovel or a dragline may be used to accomplish the same purpose. In some places, where coal is being left for later removal, the trucks haul on top of it and in others they haul over fairly well-graded roads behind the shovel in the pit lifts from which coal has been taken.

In a pit at Oswald mine, where The New River Co. has arranged for the

strip coal to be transported underground to its Oswald tipple in its regular drop-bottom cars, the Boxley company has the following equipment: one Northwest crawler-mounted Model 6 diesel dragline with 60-ft. boom and Page 1½-yd. bucket; one No. 77 Lorain 1½-yd. shovel driven by a Caterpillar D-13000 diesel which is used for both stripping and loading; one Hardsocg gasoline horizontal drill and one D8 Caterpillar tractor with bulldozer. Track for the mine cars is carried forward by coal company workmen with a switch and siding as nearly abreast of the shovel as physical conditions permit.

The pictures showing the Oswald pit were taken in a section where 2,000 tons of 4-ft. coal had been uncovered before loading began. In this pit, removal of overburden up to 40 ft. usually yields about a 60-ft. cut, or lift, of quality coal. About 40 percent of the overburden must be shot. This is done with horizontal drillholes 4½ in. in diameter and 40 to 50 ft. deep loaded with 4x16-in. sticks of low-velocity 40-percent dynamite.

From the section shown in the illustrations the outside mine-track haul is 2,800 ft. and the underground haul 2½ miles. Mine cars, which are Sanford-Day automatics of 3½ to 4½ tons capacity, are brought into the pit in trips of seven or eight. Trolley wire is carried to within 300 ft. of the loading point and three cable-reel mine locomotives are used for servicing the loading shovel. While one is spotting the trip being loaded another is pulling the loaded trip to the underground parting, while a third is on the way back to the shovel with empties.



Above: New 112-ton stripper with 2½-yd. dipper making a first cut at the Glen Jean-Collins pit. Left: The 112-ton stripper with 42-ft. boom and 32-ft. stick here demonstrates its upper dumping limit. In the foreground are R. M. Boxley, contractor, and Dan Vento, New River preparation manager.

Pit tracks are laid on wood ties to which Bethlehem steel ties have been bolted. All loading is done from 3 p.m. to 8 p.m., which is the period between the two Oswald underground shifts. Daily production from this pit has been running better than 300 tons. Strip coal is blended with the underground tonnage to comprise the raw feed to the Oswald prepartion plant. The underground tonnage is hand-loaded, part of it into mine cars and part onto chain conveyors which discharge to mine cars.

Preparation at Oswald consists of hand-picking the plus 3-in. and washing the 3x¼-in. in R. & S. Menzies hydroseparators. No crushing is done at this plant. The strip contractor is paid per ton of coal loaded into the mine cars and inspectors of The New River Co. are the sole judges of whether the coal is of merchantable qualtiy.

By frequent company inspections in the pits before loading, the contractor is saved much loss of time and effort in loading crop fringe coal which is not up to par. Dan Vento, preparation manager for the coal company, has been spending a large part of his time seeing that coals from the several pits are kept not only up to desired standards but to a quality and uniformity that will not adversely affect the standing of the company's product in the future.

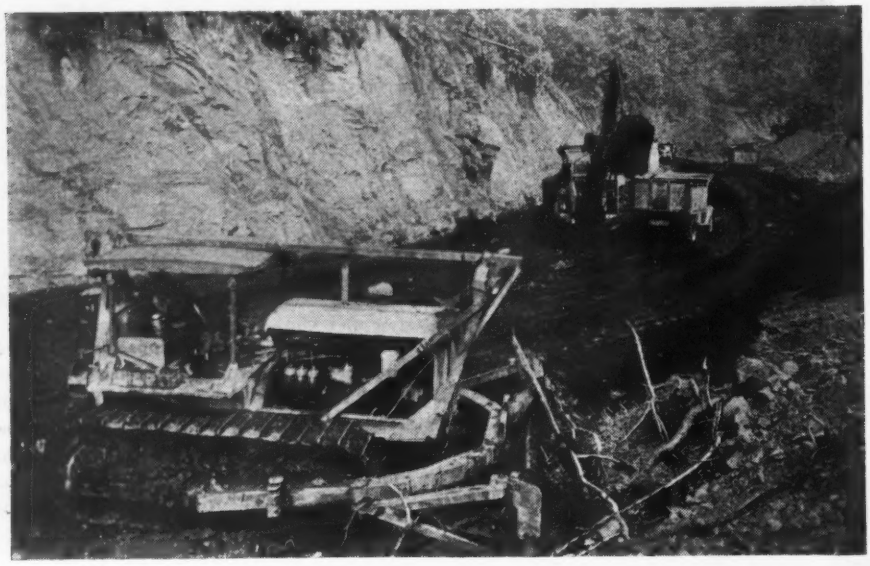
In line with the policy of maintaining quality and uniformity, the com-

pany erected at Glen Jean and began using Jan. 1, 1944, at the site of the old Collins mine, a special steel tipple with layer-loading equipment for strip coal. This plant, having two loading tracks and rated at 150 t.p.h., was built largely from secondhand materials.

At the top of the truck-dump hopper the coal must pass through a grating made of rails with openings 2x3 ft. which prevents passage of lumps so large that they would choke the apron feeder or damage the shaker screen. Slack up to ¾-in. and mine-run over ¾-in. are the sizes shipped. Two men pick on the apron-type loading boom. This picking is facilitated by a short section of screen arranged near the discharge of the shaker to put the fines on the bottom of the apron boom and the pickable sizes on top.

A Jeffrey single-roll crusher is installed to crush all or part of the strip tonnage in case the market for domestic sizes drops during periods of sustained demand for slack. The layer-loading hoist is a new Brownie Model HKG unit. By layer loading three cars at a time, segregation is minimized and uniformity maintained. C. H. Sprague & Son Co., of Boston, is the agent for The New River Co.'s coals.

The Boxley company usually maintains two or more pits from which deliveries are kept moving to the Collins tipple at Glen Jean. Of the varying hauls, about one mile is over "red-dog"-surfaced road built with government aid for hauling both coal and war-purpose timber from the coal company's premises. Haulage from loading points to connections with the road range from ¼ to 2 miles. Of the 14 gasoline trucks operated by the contractor, ten are General Motors averaging 8 tons, three are International carrying 6 tons and one a Ford of 5 tons capacity. The average for all loads is 7 tons. A request has been made for priority to purchase three International KR11 gasoline trucks on which it is expected the loads will average 10 tons.



Bulldozer cleaning and 2½-yd. shovel loading into trucks traveling on the coal in Glen Jean-Collins pit. The first cut has been taken to a 25-ft. high wall. Capacity of present stripping equipment will permit one more cut to a maximum height of 40 ft.

The 5½-ft. Sewell seam is loaded without shooting in the Glen Jean-Collins pit.

Glen Jean Equipment

Pits at Glen Jean have the following machines: One Lima Type 1201 crawler-mounted shovel (new when put into use Aug. 1, 1943) using a 2½-yd. Armco manganese bucket but capable of handling a 3½-yd. bucket (weight of this machine is 112 tons; boom length, 42 ft.; dipper stick, 32 ft., and it is driven by an 8-cylinder Cummins diesel engine); one Northwest Type 80D crawler-mounted 2½-yd. shovel driven by a Murphy diesel, this unit designed specially for coal loading; two Caterpillar tractors with LeTourneau bulldozers, one a D7 and the other a D8; one Lorain Size No. 79 crawler-mounted 1½-yd. shovel powered by a Caterpillar D-13000 diesel; and one Hardsocg horizontal drill.

The Northwest and Lorain shovels load during one 9-hour shift and strip two 10-hour shifts. The coal is dug from the solid by the shovels without undue strain. Portable equipment for moving to the pits as needed consists of the following items: one rock crusher, one Gardner-Denver 220-

c.f.m. air compressor driven by a D-1100 Caterpillar diesel; and one welding truck fitted with gas tanks and torches, together with an arc welder driven by a gasoline engine. The compressor is used for block holes and shooting rock for road grading.

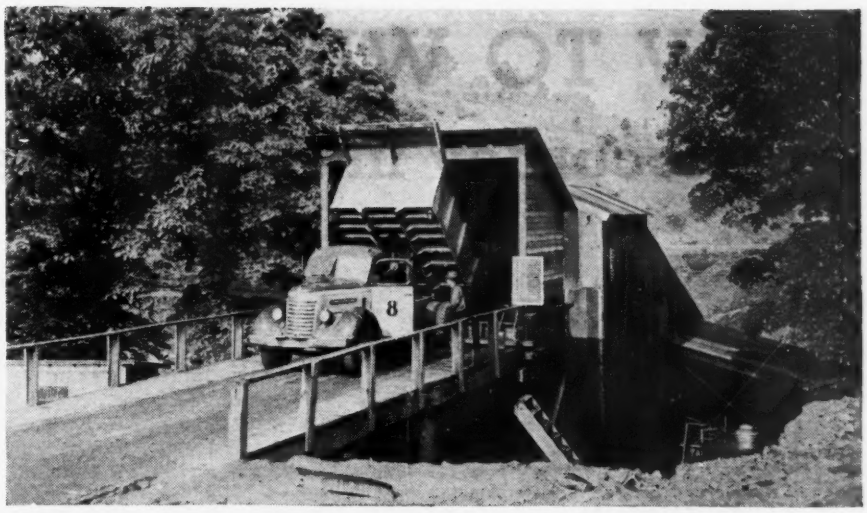
Another strip pit was started recently at Kilsyth and, because of the urge for production, this coal, which has no partings, will be loaded temporarily over a ramp. The haul is short and for this work the contractors have a Bucyrus-Erie 1½-yd. shovel and five 5-ton Ford trucks. They also have a patrol grader and an Allis-Chalmers tractor. Additional equipment includes a Hardsocg horizontal drill and a Schramm 110-ft. compressor.

Lanark First Stripping

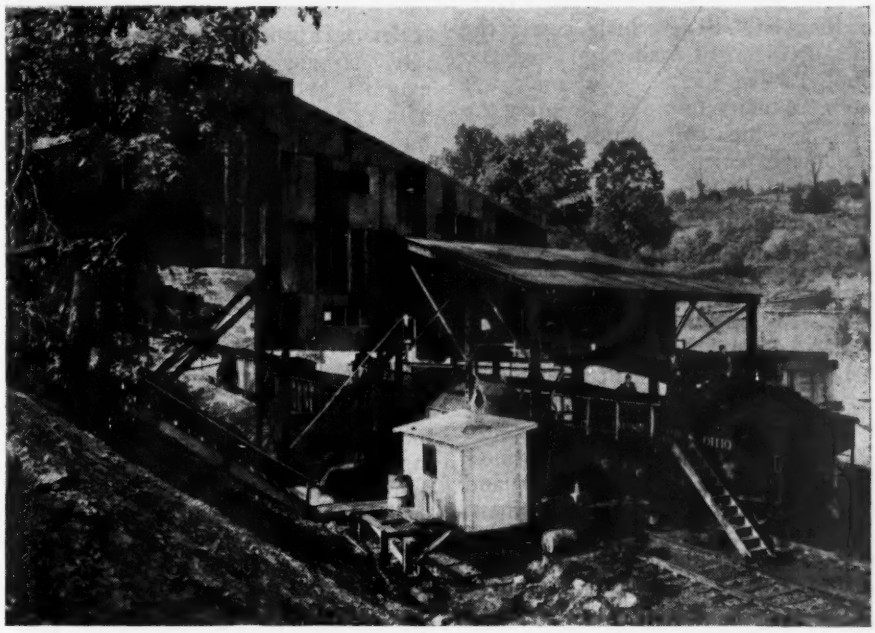
The section of outcrop which The New River Co. leases to a neighbor producer is at Tamroy, not far from the Oswald pit. This lease is to Lanark Coals, Inc., headed by P. H. Garrett, of Mt. Hope. It was put into operation in 1941 and is said to be the first successful strip mine undertaken in southern West Virginia. It includes one ridge point where no underground mining has been done, along with other outcrop behind which lie regular workings. Stripping, loading and hauling are done here by Albert Bros., Inc., and the coal is handled over a monitor plane and tipple on Piney Creek.

Members of the Boxley contracting firm and the coal company officials incline to the opinion that it will be feasible to continue some outcrop mining after the war. Over many sections of the outcrop, as strip-mined by the present equipment, there will be coal available for further removal. This may require equipment of a different type, but, considering the quantity and quality of coal left in the hills along with the roadway benches from which operations can be conducted, continuance of outcrop mining into peace times seems reasonable.

Historically it is of interest that the coal boom following World War I brought the first serious attempt to strip coal in the New River field. Early in September, 1920, the Elkhorn Piney Coal Mining Co. ordered a new Type 35B Bucyrus 1¼-yd. crawler-mounted steam shovel for stripping outcrop at Stanaford No. 3 mine. The coal was to be hauled underground to the tipple of that mine. The machine was received and put into use in March, 1921, but, because of the burst bubble, it was shut down and moved away after stripping but a few hundred feet of Sewell seam crop.



Dumping Glen Jean strip coal at Collins tipple. Bars across top of hopper limit lumps to 24x36 in.



Mostly second-hand materials went into this new strip tipple on site of old Collins plant.

Layer-loading three cars at a time at the Glen Jean-Collins tipple insures uniformity.

HOW TO WEIGH
For Accuracy in Mine-Scale Operation*

Assuming the Mine Scale Has Adequate Capacity, Weighrail Length, Grades and Location Should Be Right—Tonnage Control Involves Checking as to Where Leaks Really Occur Before Tackling Scale

By **HARRY M. ROESER**
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Secretary, National Scale Men's Association

THE TROUBLE which besets the measurement of coal originated, no doubt, when the first coal mine was no more than a foot deep. During the 30 years which corresponds to my professional experience with it, the aspects have changed from time to time with the development of mining methods, but the grief remains.

At once my relation to mine scales and weighing methods may be identified. It is different from most of those interested. I have never dug coal or had any coal of my own to weigh. My experience has been with weighing machinery, its functions, maintenance and operation. In short, my business is making weighing machinery and making it work—and it is a business. And in this paper, I am limiting myself to mine scales and weighing methods used in determining the quantity of coal produced and from which cash income is derived. Scales and weighing methods involved in the processing of coal within a plant will not be touched upon; first, because of the proprietary nature of some of them; and second, there are those who can handle better that phase of the subject.

Two radically different weighing devices are used at coal mines: namely, (a) hopper scales and (b) track scales. The track scale, the primary subject of this paper, is adaptable to a wide variety of circumstances of use, is readily procurable, is economical in cost and maintenance and is distinguished by accuracy in service.

Scale Requirements

General—When purchasing a scale, a sound principle for a coal operator to keep in mind is that, except for a few specialists in the business, the man who comes carrying a scale manufacturer's catalog knows no more about the practical conditions of handling coal in mining operations than the operator knows about manufacturing scales. In many instances it may safely be said he does not even know as much about scales as the operator. This is not an indictment of the scale business. The circumstances are the same in any merchandising operation. It is a fact, however. As a manufacturer of weighing machinery and a salesman, I lay it down and emphasize it unabashed, and justify doing so with the statement the circumstances are as great a source of discomfort to me as they are to coal-mine operators.

A scale must not only weigh something. Its features must be such as to convey confidence that the weighing results are correct. From this derives an axiom common among scale men: "An honest scale is no good if nobody believes it is honest." Some of them point to the coal-mining industry as an apt illustration of the cogency of the utterance. The situation is the result of operators having poor technical advice, or ignoring it if they have had good advice.

Capacity – One outstanding deficiency of coal-mine weighing layouts is lack of strength of scale parts. The fact grows out of a common situation in which the operator estimates the size of loads expected to be weighed, and a catalog carrier in the scale business points to a picture in the book whose title indicates the subject will handle that much load. The customer signs an order and is delivered not only a scale but a lot of grief for the life of the mine.

That circumstance may properly be regarded as the fault of the scale business, which catalogs its articles without giving due consideration to the fact that the load sustaining capacity of a scale has not much to do with its serviceability at a coal mine. Salesmen of experience working the coal-mine trade, however, do give it consideration and largely disregard the catalog pages in recommending equipment. The need is judged in terms of the practical operating conditions, and no such man takes them sight unseen. He cannot do his job confidently without studying the layout with his own eyes, and usually his recommendations are for twice to three times the capacity of scale offered by the catalog carriers. The economy is sound both from first cost and service expense.

The object is to get sufficient mass into the scale parts to prevent derangement under the normal traffic. Track conditions are not always the best, and the hired help cannot be expected to be constantly alert to the fact that some delicate machinery is under the deck and must be babied along to avert misperformance as the result of derangement under the handling of cars. As the practical scale man puts it, "Make the scale heavy enough so that whatever hits it will bounce instead of the scale." To impart confidence that the scale is suitable for the purpose, it must have the appearance.

Weighrail Length

The length of the scale rails has an important bearing on scale performance. The circumstances, which differ according to the method of weighing, may be briefly outlined as follows:

Stationary Weighing – At rotary dump operations and some others, cars are weighed while standing still on the scale, uncoupled or coupled to other cars. In such instances, the scale rails need to be sufficiently longer than the car wheelbase that stopping cars on the scale for weighing can be managed without jockeying by the

* Abstract of an article entitled "Mine Scales and Weighing Methods," presented at the December, 1944, meeting of the Kentucky Mining Institute.

The mine scale is a reliable weighing instrument and when operated in conjunction with proper tonnage controls insures maximum accuracy in weight determination.

tipple hands. Usually 6 or 8 ft. is enough.

Motion Weighing, Gravity—At many locations cars are weighed en route to the dump as they drift over the scale uncoupled under the influence of gravity. The scale must be sufficiently long that the car at its normal rate of speed will remain on the scale long enough for the weighing operation to be completed. Such installations usually are equipped with an automatic device that requires about 2½ seconds to finish weighing after the car is completely on the scale. To meet this condition the scale length requirements, depending upon the car wheelbase, usually are 12 to 14 ft.; rarely more.

Motion Weighing, Coupled—The practice of weighing cars coupled in trips and moving has grown with the increase in bottom-dump-car operations. If the cars are the same length, the best length for scale weighrails is the coupler-pin-to-coupler-pin distance of cars coupled in the trip. If more than one size of car is used, the weighrail length must be the coupler-to-coupler distance of the shortest car. It is best to consider no variation from what has just been said. The method is sound and, when the weighing layout is properly prepared and operated, excellent results are obtained. But the word of a scale man must be observed: liberties cannot be taken with it.

Grades

Many a weighing layout is spoiled by inadequate attention to track grade. For *stationary weighing* the requirement for a flat or very slight grade is obvious. However, when loads are weighed while moving, sharp attention to the practical features is advisable. It may be said in passing that any man who can use his eyes has found numerous examples of gravity weighing layouts made obsolete by changes in the rolling stock. Ten years or more ago, a layout with a 10-ft. weighrail and a track grade of 1½ percent or more was thoroughly adequate for weighing the cars then used. Cars with roller bearings and the longer wheelbase common in the present era roll past such scales so fast that the weighing machinery does not finish its work before they are in the dump.

For *gravity weighing* operations, the grade should be such that a car rolling freely on the scale will not accelerate. For roller-bearing cars, 0.25 percent is enough for the scale rails and for a car length at each end; for straight journal cars, 1.5 percent or more, according to the condition of the rolling stock.

For *coupled motion weighing* the grade requirements are different, de-

pending upon whether trips are brought to the scale with the locomotive in front or behind. The object is to get the cars over the scale with no reaction at the couplers. If the cars are pulled, tangent track should grade downward to the scale at 0.25 percent for a distance at least equal to the length of the trip, over the scale, and a car length beyond. From there the grade is immaterial. If cars are pushed, the grade in the track up to a point a car length ahead of the scale is immaterial. Beginning at a car length in front of the scale, over the scale, and for at least a trip length beyond, tangent track should grade downward at 0.50 percent. The arrangement is illustrated in the accompanying diagram. In both cases the travel must be uniform, as variations in the amount of slack in the trip may cause disturbance in the weighing.

The subject of track grades cannot be completed without a warning against attempting weighing in a track laid upgrade. Happily enough, it seems that nearly everyone has already discovered the fact, but now and then instances are found of coal operators learning an expensive lesson. The laws of nature being what they are, weighing simply cannot be done satisfactorily on a scale with cars moving upgrade.

Location

A scale is a device for measuring the force with which objects, such as carloads of coal, are pulled toward the center of the earth by the forces of gravity. The magnitude of the load is measured by the amount of the pull, so that, if the purpose is to find out how much coal is in a load, it is absolutely necessary to prevent any and all forces other than the force of gravity from acting upon it. Any unnatural restraint on the load adds to, or subtracts from, the force of gravity, and the result is erratic weighing. The principle that scales must be isolated from disturbing forces of all types often is violated as the result of poor or unfortunate judgment in the location of the scales.

Men of experience realize, of course, that coal-mine operators build tipples for handing coal and not for holding up scales, and give due consideration to the idea when offering weighing equipment. Nevertheless, there are limits beyond which such men will not go in the location of weighing machinery on coal tipples. When such a man appears to hedge and wants the equipment located on a structure built up separately from the tipple, or wants it located on the ground away from the tipple, giving him his head is not unwise. The necessity for insulation from tipple disturbances is less than formerly, but there are still plenty of cases where mounting a weighing outfit in the tipple structure and expecting satisfactory results from it is inadvisable to the point of foolhardiness.

The weight indicator must be kept close to the scale. As the result of what I am pleased to call office-boy engineering, catalog carrier salesmanship, or both, instances are too common where the weigh house containing the weight indicator is located away from the scale track, the connections being through a train of extension levers. This is an evil construction that inevitably deteriorates rapidly with time. Among scale men, the construction is looked upon with disfavor even under the best of circumstances. The disturbances that result from the extraordinary vibration and relative settlement or shifting of supports which are the nature of coal tipples inexorably manifest themselves. Instances of such construction are in service where it is a safe bet that a carload of coal cannot be weighed correctly! Two correct principles may be safely followed: (1) Locate the weight indicator as close to the scale track as the law will allow; (2) locate the weight indicator on the same structure, or part of the structure, that supports the scale track.

In respect to the second principle, vibration is not of itself a particularly disturbing factor in weighing, provided only that all parts of the weighing outfit are shaken in unison with the same amplitude and frequency. The effect can be controlled. If, however, the scale track is on one part of the structure and the weight indicator on another, or any other condition prevails that makes one element move in one direction while the other element moves another, and at different rates, freakish results can happen, and usually do.

At *rotary dumps* a common practice is to locate the scale immediately ahead of the dump. The results usually are sad. Settlement of the structure in the approach to the dump ring produces derangement of the scale parts. A common accident is the freezing of couplers so that when the dump turns over it not only empties the car in the dump but also the one on the scale track, and not infrequently causes considerable property damage in the immediate structure including the scale. A scale cannot go through many such experiences and be much good afterward.

The correct practice at rotary-dump operations is to locate the scale in relation to the dump so that the third or fourth car from the one in the dump is standing on the scale being weighed while the dump is turning over.

At *bottom dump* operations weighing is done with cars coupled in trips and moving. The scale should be located in tangent track, and the specifications previously noted for grades should be followed.

In general, for all motion weighing jobs, the scale must be located in track sufficiently free from curves adjacent to the scale that cars can straighten out to a smooth forward motion before they are weighed.

Tonnage Control

The problem of tonnage control, or maintaining a check between tipple and railroad weights, is one that makes scale men shudder. To them this universal problem is especially grievous because they know that when it becomes serious enough for a coal-mine operator to begin worrying, the shortage is so great that it is virtually impossible for the weighing equipment to be responsible. Nevertheless, because the scale is the most obvious thing on the premises to suspect, scale men find themselves in the middle and on the defensive.

This phase of the discussion may be prefaced with the statement that 30 years of experience weighing coal up and down the bituminous fields shows that a certain degree of shortage between tipple and railroad weights is normal, that it is against nature for the two weights to check and that least of all is it natural for tipple weights to run ahead of railroad weights. The normal shortage is from 0.5 to 0.75 percent; rarely less. If more than that, one who knows his way around a coal mine can, if given the opportunity, do something about it.

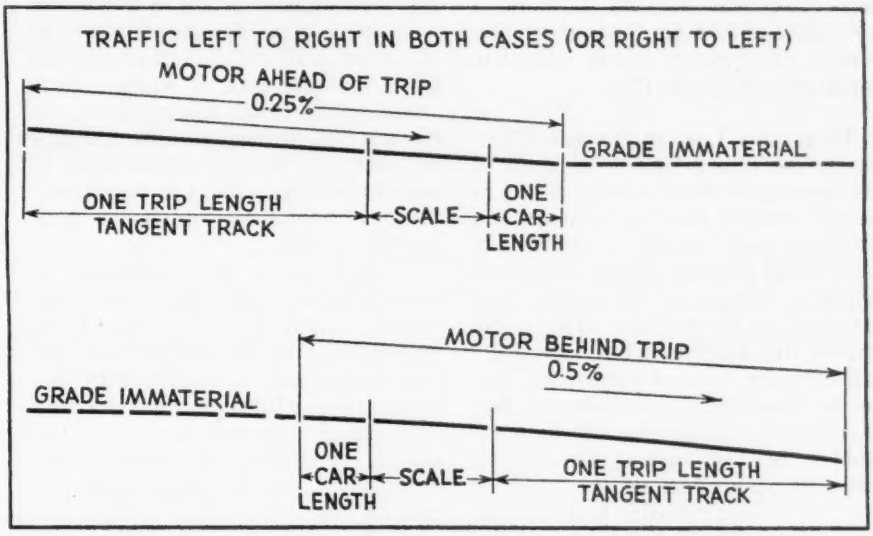
Shortage figures greater than those just mentioned are common, of course; the most extreme case in my experience being 8 percent—an instance, apparently, of a coal mine working at least two full days a month without having coal to show for it. Regarding such, no coal-mine operator has heard this from a scale man before, perhaps, but it is not original with me: If the scale is responsible for shortage of 1.5 percent or more, the services of a scale expert are unneces-

sary to determine if something is wrong with it. It will be obvious to the most casual observer, for the scale literally will be falling apart.

Before going into details, it is perhaps apropos to say that the tin-ear scale men turn toward complaints of loss of coal when shortages appear is based not only on what has just been said but also on the blunt fact there is no loss of coal. For, if the tipple scale is weighing in excess, the coal said to be lost is really still in the mine, and if the tipple scale is weighing correctly when railroad weights turn up short, the coal is still on the premises between the tipple scale and the loading point. It cannot be anywhere else. What is lost, of course, is the pay-off on tipple records for the tonnage that subsequently does not appear in the invoices based on railroad weights, but the coal itself still is available. The so-called loss is nothing more nor less than the result of circumstances that have the same effect in the end as padding the tipple records.

Running down the causes of shortage between tipple and railroad weights is a not uncommon item of service furnished to the industry by men in the weighing-machinery business. We stick firmly to the principle, however, that the primary job is to weigh correctly the coal that comes to the scale, considering what happens to it afterward to be a feature of mine operation that cannot be entered into without invading the proper responsibilities of the mine operator. Some common causes of shortage may be itemized and methods of correction suggested.

Tare Weight Control—A common cause of discrepancy between tipple and railroad weights is inadequate tare weight control. The usual practice is to use one or more average tare weights, depending upon the types of cars used for hauling. Unfortunately, it usually happens that the tare weight fixed is too low. One contributing reason is inadequate sampling of cars to be weighed in establishing the tare weight. For so important a figure, it seems strange to a scale man that miners will establish it by weighing a relatively few samples, usually no more than 10 percent or less of the cars in use. The correct answer to how many cars should be weighed is: all of them. The justification for that apparently extreme number is that any figure derived from a lesser quantity has a chance to be wrong. The probability is the same, of course, that a figure derived from a small sample will be too heavy as too light, but tare weights



Grade requirements for coal-mine track scales when cars are weighed coupled and in motion under the two conditions of locomotive ahead of or behind the trip.

that are too large tend to reduce the apparent shortage, and, thus, we never hear of them. In every case the forces of nature operate to make the established tare weight too light, the visible effect of which is a practical padding of the tipple sheet.

Another contributing factor which confounds scale men is the practice of cleaning out the cars slick as a whistle before they are weighed to establish the average tare. To scale men it is obvious, as it must be to anyone who gives it the slightest thought, that the tare weight so established cannot be valid any longer than is required to run the first trip out of the mine. Cars used for coal that is only moderately wet, that stands in the open or is hauled relatively long distances outside inevitably retain coal that packs in the bottom and on the sides and adds fiction to the tipple records with results as stated.

In some regions the variation in average weight is seasonal. Whether or not this is so, common sense dictates that the average tare should be checked or tested frequently. To the question, "How frequently?" do not be astonished if a scale man makes himself dogmatic that once a month is often enough. Certainly it should be the first thing tested any time an operator finds himself with a railroad shortage worth worrying about. It is about as certain as sunrise that the condition cannot be remedied by testing the scale.

Two simple remedies for the tare-weight difficulty may be suggested. The first is to weigh empty cars in their normal condition as they are used for hauling coal. For that remedy the best that can be said is that it is simple. I know and understand as well as anyone that it is not, or has not, been practical. A second remedy both practical and simple is to put a dump hand with a shovel to cleaning out each car each time as it comes from the dump. In most instances it will be the best investment a coal-mine operator can make in day labor and coal shovels. Do not, however, follow in the steps of one coal operator to whom this idea was suggested. He put a man to cleaning out the empties, sure enough, and the cleaning operation was supervised and carried out with consummate zeal. The only thing wrong was that the empty track was immediately alongside the loaded track, and the coal removed from the empties was shoveled over on top of loads coming up to the scale to be weighed. He did not come out well.

Here may be sounded a warning. The practice of marking each car with its tare weight and using individual tare weights for establishing the quantity of coal is not yet common, but it has been found in enough instances to justify anticipation of its growth. Whether the practice contributes to relief against the padding of tipple records is doubtful, but even if it does it is getting relief the hard way. The argument for it is specious, and its general use will only add to the general discontent. Mine operators will be prudent in hedging against development of the practice.

Diversion—Much apparent difference between tipple and railroad tonnage derives from loose accounting for coal and refuse taken out between the tipple scale and the loading point. Usually some attempt is made to account for the coal diverted for houses and power, and for refuse removed. In recent years, improvement in methods

and equipment for the purpose is noticeable, but under the best circumstances they rarely justify complete confidence in the results.

Theft and Loss in Transit—Commonly the idea is held that much of the shortage is due to theft or loss in transit between the loading point and weighing point on the railroad, especially if the coal must be hauled a considerable distance in the railroad cars before it can be weighed. That some loss of the kind occurs is inevitable, and certainly cases of exceptional loss due to those causes have occurred, but it is equally certain that all the coal said to be lost cannot possibly be stolen or strewed along the right of way. It is more probable that the coal never got to the railroad cars in the first place.

Railroad scales are instruments of interstate commerce. Although not perfect, they nevertheless are closely supervised by trained personnel, and systematic checks between weighing points by the reweighing of cars are made by agencies established for the purpose. The agreement is close enough and universal enough to justify confidence in comparative infallibility. That is to say, reasons are ample for a bad railroad weight now and then, but that all or any considerable portion of weights over a period of time are bad is out of the question. It simply does not happen.

Loss of Moisture—Some of the apparent discrepancy between tipple and railroad tonnage undoubtedly is due to loss of moisture by evaporation or actual leakage from cars if coal is exceptionally wet. I have seen cars lose as much as 300 lb. standing on a scale while a man was trying to weigh them. This phase, I think, may be passed over lightly. The effects are obvious, the causes well known and, generally speaking, adequate provision for it is made in railroad tariffs, water allowances and otherwise.

Tracing Leaks

To scale men engaged in furnishing equipment and maintenance service to the coal-mining industry, the ubiquitous problem of maintaining agreement between tipple and railroad tonnage has a definite pattern. The user of the Diogenes Scale Mfg. Co. equipment sometimes around the tenth of the month comes up with a complaint about tonnage shortage. He never says how much shortage in how much tonnage, and seldom goes into any of the other practical circumstances, but he is sure the scale is wrong. Such complaints are not taken lightly, because we know that when the shortage becomes bad enough for the man to become articulate about it, the chances are he should have complained quite a while sooner.

I have heard the equipment of manufacturers, including our own, roundly cursed, the general idea being that before the equipment was procured there was no trouble with tonnage control, while nothing but trouble occurred after it was procured. The reason, of course, is simple. The scale man usually finds that the trouble was always there but not discovered until equipment good enough for the purpose became available.

The clear pattern of such complaints makes for a clear and usually sure pattern for handling them. Each outfit, I suppose, has its own methods, but our own private ritual is simple and, as there is no secret about it, the method may as well be outlined. Most of it can be handled as well by the coal-mine operator as by a scale man anyway. Each man is coached to develop certain inquiries and to follow certain instructions. The schedule of operations is:

1. When were cars last weighed for tare?
2. Was the tare weight increased or decreased and how much?
3. How many cars a month are weighed (calculate the deficiency per car)?
4. How much refuse thrown out, and is it docked from the tipple records (ask the superintendent)?
5. Ask the same question of the tipple boss (the superintendent and the tipple boss seldom agree, but the latter usually has the closer answer).
6. Ask the same question of the man responsible for disposal of the refuse (if the superintendent and the tipple boss agree the answer usually is correct unless both disagree with the man who disposes of the refuse, in which case the odds favor the last having the better answer).
7. Check the accounting for coal diverted for house and power use.
8. Calculate the percentage the scale has to be off to produce the alleged discrepancy.
9. With the information thus developed, if the discrepancy cannot be reconciled to closer than 0.5 percent, examine and test the weighing outfit thoroughly.
10. In the absence of obvious evidence of physical derangement, damage or lack of repair that might cause a discrepancy of greater than 0.5 percent, discard all the information obtained by local inquiry and go after the answers yourself.

Believe me, the routine can and does fix tonnage shortages without a hand being put to the scale.

Sources of Service

Whenever service on weighing equipment is needed, using any but the best is poor economy. I am sorry to have to say that good scale men are at a premium and those that are available are overworked. The woods are full of scissors grinders whose status on the income tax rolls is evidence of the general soundness with which scale manufacturers build weighing machinery. They prosper because the weighing machinery they get paid for fixing did not need fixing anyway and, of course, operators are left with the tonnage leaks that caused the disturbance. Everybody loses but the scissors grinders.

Variety in equipment is such that an operator requiring scale service should satisfy himself that the man hired for the job, if he is not an agent of the manufacturer, is qualified by the manufacturer to perform the service. The facts can be established with one exchange of correspondence, either by letter or telegraph, with the manufacturer; or the secretary of the National Scale Men's Association will know if an agency is one of established reputation.

Finally, scale men are of a craft apart. Association with the immutable law of gravity does things to them. Through an automatic process of elimination those that survive are hardheaded, stubborn, durable men who know no compromise between right and wrong. They may not be combative on the point; nevertheless, deep in the consciousness of each is the motivating principle: a certain amount of trouble is essential to prove that a weighing routine is properly handled and the absence of trouble proves only that the operator is being imposed upon. In the coal-mining business in particular, the absence of weight disputes proves only that a mine operator is giving away so much coal nobody will argue with him. The fact may be deplorable, but it cannot be ignored that a coal-mine operator needs a scale man worse when he thinks he is out of trouble than when he is in it.

LOADS SPRINKLED

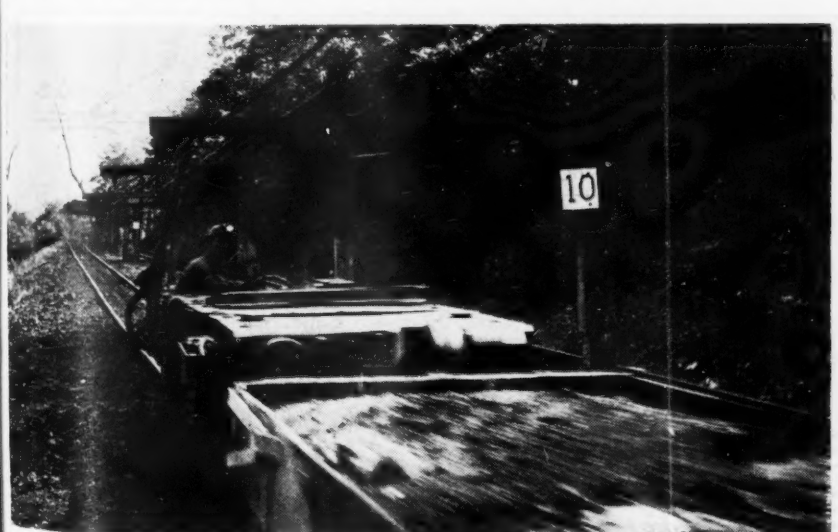
On the Fly Without Waste of Water

Locomotive Trolley Wheel Opens Valve—Motorman Closes It by Nip Connected to Frame—Device Allays Dust Without Loss of Time—Saves Water and Still Keeps Tracks From Getting Wet

SPRINKLING loaded cars on the fly to allay dust calls for sprays of large volume. If water is to be conserved and the track saved from excessive wetting, a semi-automatic means of turning the water on and off is a practical necessity unless extra labor is employed. A system combining manual and automatic controls has been used with satisfaction for over a year at Powellton No. 6 mine of Koppers Coal Division, Powellton, W. Va.

Use of an electric eye was given consideration at first, but that equipment was not readily available, so a system that required only parts which could be found around the mines or made in the mine shop was devised. R. R. Hanna, mine electrician, won a $100 prize for a model of the sprinkler exhibited at the gadget show of the Kanawha Mining Institute at Montgomery in September, 1943.

Sprinkler in action giving a trip on the move a thorough wetting.



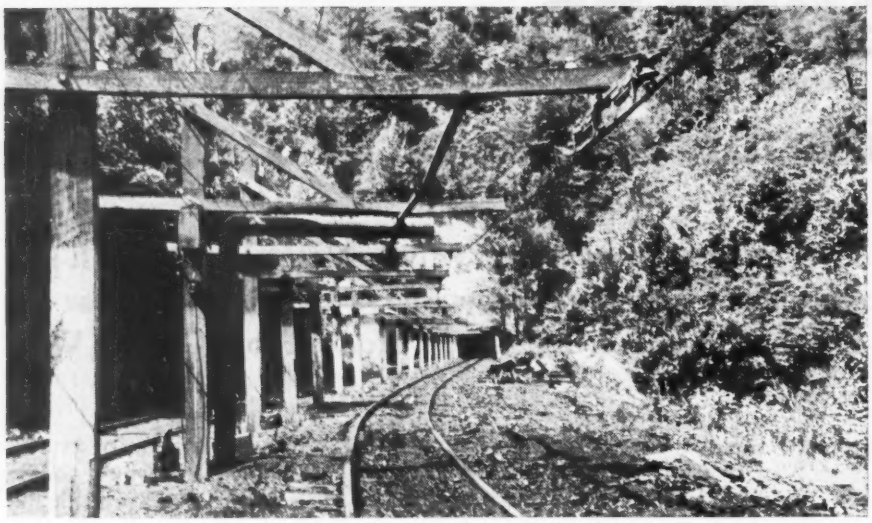
Locomotive passing the 10-car-trip sign. But as this trip consists of 30 cars, the motorman will wait for the "30" sign and then raise a ground nip and touch the control wire to shut off the spray.

By making contact with strips mounted close to the trolley wire the trolley wheel of the haulage locomotive causes the sprinkler valve to open. With a nip or stinger connected electrically to the frame of the locomotive (grounded), the motorman touches a short length of wire mounted parallel to the trolley wire to close the valve at the right time corresponding to the length of his trip. If he fails to touch the wire, passage of the trolley wheel through another double-strip contact automatically closes the valve. The four sections of wire for manual nipping are placed at distances to stop the water upon passage of trips of 10, 20, 30 or 40 cars, and the wires are so marked by signs on the trolley posts.

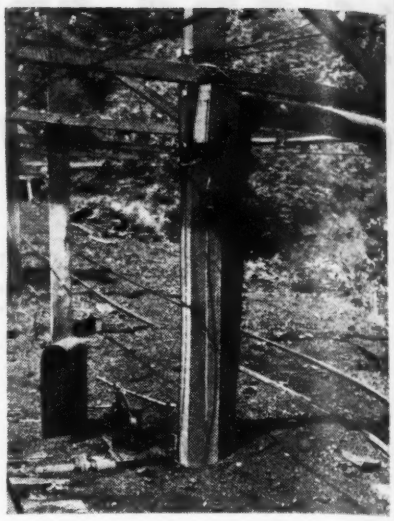
Sprinkling is done on the loaded track of the double-tracked tramroad just outby the portal leading to the tipple on Loup Creek. Water comes by gravity through a 6-in. pipe 50 ft. long from an underground sump formed by a dam at a drift opening. Water level in the sump is 14 ft. above the sprinkler pipe.

The 2-in. sprinkler pipe is mounted parallel to the track, above the center, and extends 10 ft. each way from the 6-in. feed pipe. Water pours out so fast that, although the trip is not slowed for spraying, the coal is wetted practically to the bottom of the car. Thus very little dust appears at the dump in the headhouse, at the hillside conveyor transfer, or in the tipple. Without the spray, clouds of dust arose at each point. The coal is loaded mine-run for byproduct purposes.

The solenoid-operated valve, placed on the ground between tracks, consists of a partitioned box utilizing a pump valve held down by a noncorrosive



Showing the 6-in. feed pipe, the 2-in. spray pipe above the center of the track and Contact No. 1 on the trolley wire.



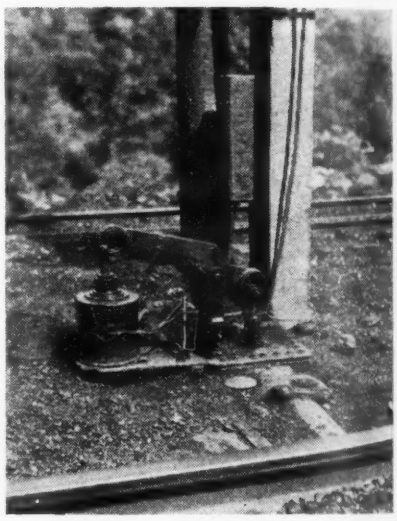
At the base of the post is the valve and solenoid with cover off. On the post is a cut-out switch and the starting relay.

bronze spring from a lightning arrester. The coil is from an automatic reclosing circuit breaker. As indicated by the wiring diagram, three relays are required.

When the trolley wheel makes contact at No. 1, current goes through the "resistance contact" to the solenoid of the valve and also splits and goes through the coil of the starting relay, and then on through the normally closed contacts of the nipping and shut-off relays to ground. When the contact of the starting relay closes, power is thereby maintained on the valve solenoid after the trolley wheel has passed out of contact strip No. 1. When the solenoid is pulled down it opens an auxiliary contact which places resistance in the solenoid coil circuit to prevent overheating.

Assuming that a trip consists of 30 cars, when the locomotive gets to the sign marked "30" the motorman raises the grounding nip and touches the auxiliary wire mounted parallel to the trolley and about 30 in. away from it. That opens the contact of the nipping shut-off relay, thereby opening the circuit of the starting relay coil and dropping out its contact which was energizing the valve solenoid. If for any reason the motorman should fail to do the nipping, passage of the wheel through No. 2 contact causes the automatic shut-off relay to open that same circuit to the starting relay.

Because water draining to the sump is never plentiful and actually is scarce during dry seasons, nipping to shut off the water immediately at end of a trip of any length and the automatic arrangement for insuring final shut-off are necessary.



Valve and solenoid with cover removed to show construction. The solenoid resistance is in the small steel box on the post.

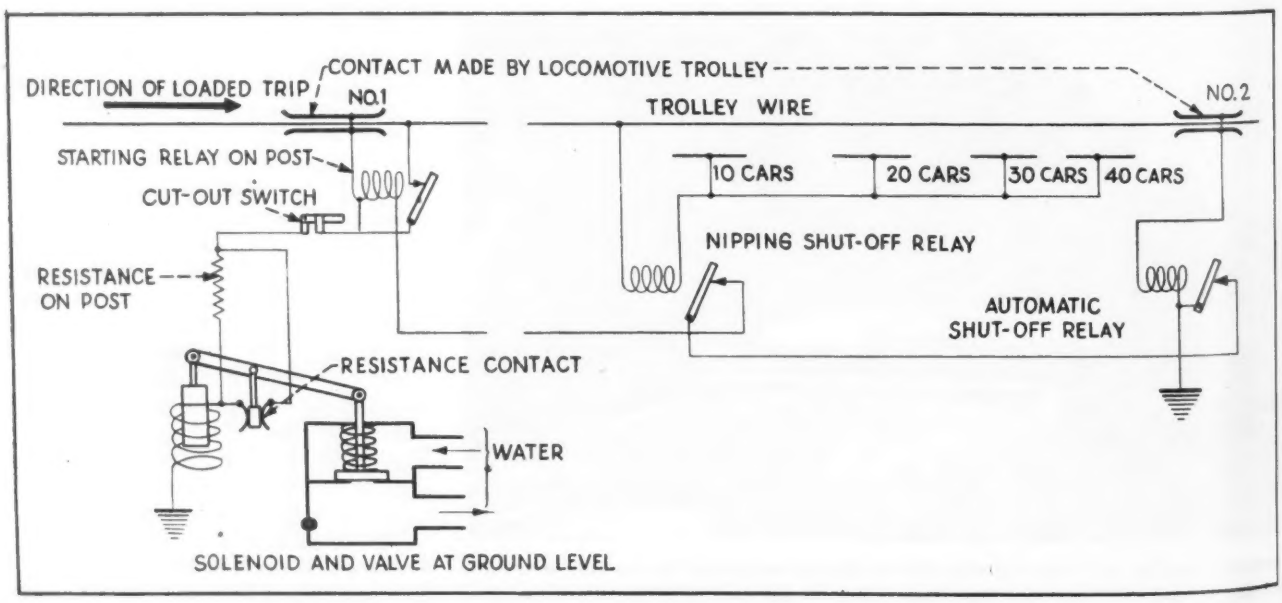


Diagram of sprinkler-valve solenoid circuit and its controls—both manual and automatic.

DESIGNING A MINE

For Maximum Efficiency in Production

Concentration of Work a Major Objective in Laying Out a Mechanical Operation—The Plan Should Provide a Schedule of Development and for Safe, Low-Cost Haulage, Drainage and Ventilation

By J. H. DICKERSON
Mining Engineer
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WITH A virgin coal area before him, the mining engineer with a commission to lay out a new mechanical operation has the responsibility of projecting the workings and scheduling mining not only for the cheapest face cost but also for maximum efficiency in haulage, ventilation, drainage, safety, maintenance and similar factors, in addition to minimum investment in equipment and facilities.

The map shown in Fig. 1 was a preliminary projection for a mine. The grades were established from elevations at crop openings. From these elevations it appeared that grades could be kept down to 3½ percent, but even 3½ percent was steeper than desired and some drillholes were put down as a check. These showed even sharper inclinations which would require much grading and consequently the projection was not used. However, it is offered here to illustrate some of the features usually considered desirable in mine layouts.

Entries were laid out to keep track grades to a minimum without making the workings too irregular. Butts and faces did not have to be considered because their direction was not regular. Most of the room entries are at right angles to the haulage. The three-heading entry system is shown with a belt conveyor in the center. It could be loaded by duckbills or other conveyors. For this plan it is desirable to extend the belt to the limit. Then from three to five rooms can be started on each side, and the belt loaded to capacity until the barrier pillar finishes the panel. A 1,500-ft. belt is shown but in some layouts a shorter belt is desirable.

On the basis of the original contours all room entries in the main mine would drain toward the haulway, where 10-ton drop-bottom cars were to be used on 60-lb. rail. Haulways dip to the outside and, where convenient, places would be driven outside for drains. Grades for belt conveyors generally are steeper than the haulways, but, being mostly favorable to the loads, they would save power. Mine cars would be loaded in trips while the haulage motor would be taking other cars to the tipple, where they would be released to go back to the mine within a few minutes.

Concentration Promoted

In many places, with one belt loaded mechanically from rooms started at the extreme end and retreating toward the haulway, another belt working triple headings for future rooms, and some main entry development with mechanical loading, 2,000 tons could be produced per day of two shifts. Such concentration would permit close

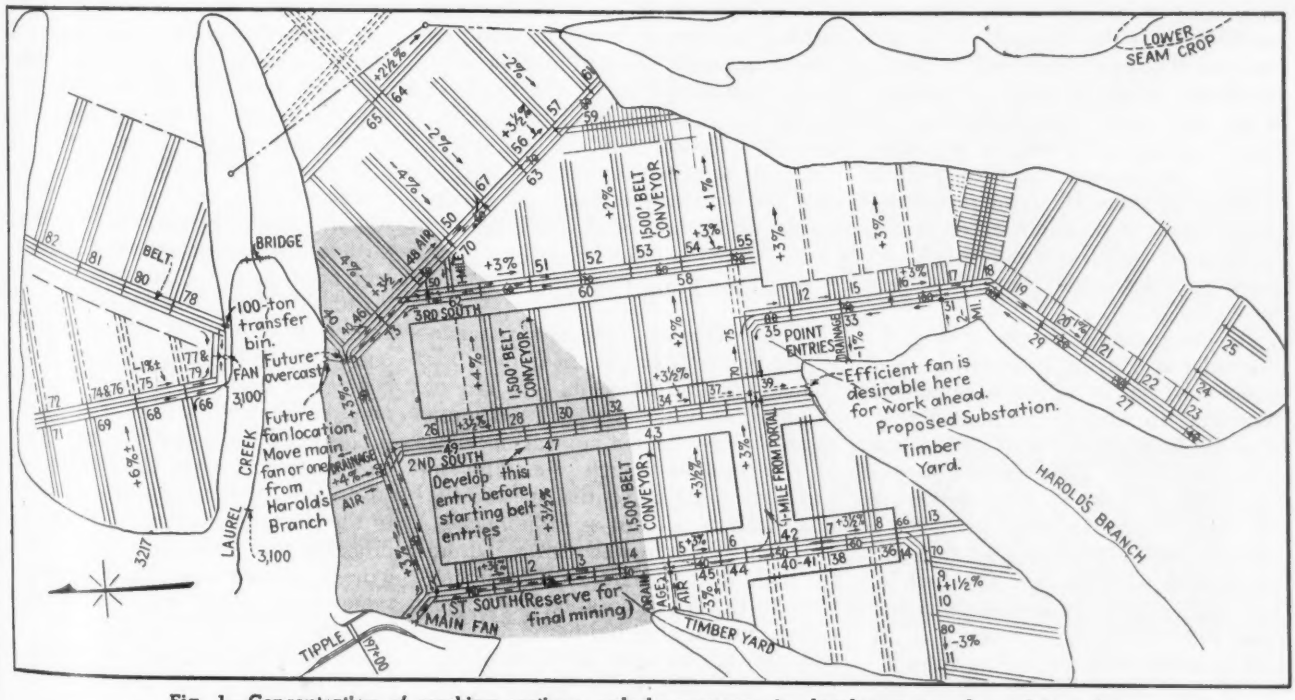

Fig. 1—Concentration of working sections, orderly sequence in development and provisions for economical and safe haulage, drainage and ventilation were the thoughts behind this mine layout.

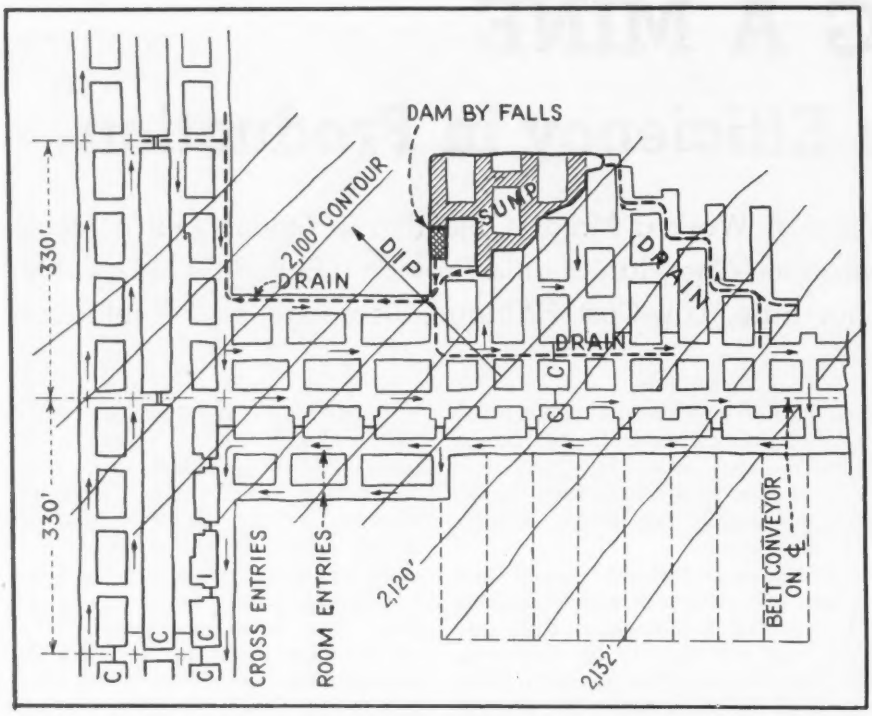

Fig. 2—Layout of room panel for conveyor operation with belt transportation.

supervision of workings, reduce track to a minimum, promote safety and efficiency, provide better ventilation than with scattered workings, and save the maintenance of track, entries, etc., that otherwise would have to be driven before they were needed.

Planning Helps

In looking over a large number of maps this year, I have come to the conclusion that one of the worst faults in mining at present is too scattered work. This is due in part to the development of large mines before mechanization. In these mines, of course, it was necessary to have larger areas for hand loading. This will be corrected in time, but to assist the management in planning ahead the mine projection should show a desirable order of development, and this order should be followed unless good reason is shown for a change.

In the example shown in Fig. 1, the order of starting room entries and removal of barrier pillars is shown by numbers. In working Sections 1 to 7 it would be necessary to have but one main-line track. Then entries should be started to have 12 ready following 11. When 14 barrier pillars are worked out and sealed off, the workings will be on one main haulway for a while, but 2d South Entry should be developed before Section 25 is reached. It will be noted while retreating from 27 to 35 that room entries will be advancing from 26 to 37, bringing the workings closer together. Section 73 is the last one numbered. By the time it is started, Sections 66, 68, 69, 71 and 72 would be started in a new mine north of Laurel Creek. With 42-in. coal and about 80 percent recovery, the numbered blocks should produce about 90,000 tons of coal each.

The worked-out sections from 1 to 40 inclusive are shown in heavy full lines in Fig. 1. The dotted lines show where entries and track would be eliminated with the completion of Section 45. The shaded area in Fig. 1 shows the limited extent of workings with Section 46 started. It will be seen that sometimes track removal may be more rapid than the laying of new track. A substation near the head of Harold's Branch probably could be used about five years and then should be moved to near the fan location where the entries come out on the Laurel Creek side.

Two Fans Desirable

Two efficient low-pressure fans would be desirable for this mine. One near the main drift would take care of the ventilation with ample air at minimum pressure until a fan was installed on the Harold's Branch side. The entire mine could be ventilated from the first location but not as economically. One fan would answer if moved from the main drift to Harold's Branch, and then to the future location on Laurel Creek, but there would be times when two fans would save doors, overcasts, power, etc., and a fan would be required later on the other side of Laurel.

Using the fan on the Harold's Branch side there could be three splits, one drawing air through the main portal and a drainway to serve 1st South, then a split the same way to serve 2d South and a circuit to serve the Point Entries. When the latter became the open split, the pressure could be relieved by an opening to the outside and an overcast. The splits for 1st and 2d South would not have to have air moving outwardly much of the way in the opposite direction from the intake air. In this way leakage would be reduced and the pressure could be kept to a minimum. For the same quantity of air the power load varies as the pressure, although the efficiency of the equipment may not be the same.

Fig. 2 shows a triple-heading entry with belt conveyor in the center heading and rooms working on one side as the headings advance. From the way entries are laid out the rooms on this side will be worked to the dip, and on the other side to the rise. It might be desirable to have rooms on one side only, but this would nearly double the cost per ton for moving the belt to the next location, and besides would reduce the average tonnage. If the grades are fairly uniform there will be little tendency for water on the dip side to reach the center heading, and where water collected in the face of rooms only a short pipeline and a few feet of lift would be required to pump it to a drain.

Air With Protection

The ventilation for this system of working was discussed in Coal Age for September, 1944. The main air current is carried in the outside headings and consequently there is not so strong a current along the belt and at the loading points. This reduces the dust picked up by the intake air and provides better ventilation. Crosscuts to the return airway may be made farther apart, reducing leakage and the cost of stoppings. This also improves ventilation and reduces power costs. Better protection is given the belt entry and the headings produce 50 percent more coal. In some cases pillars may be drawn back to the outside headings. Rooms are worked to provide more coal while the headings are advancing, but if headings are driven to the limit before starting rooms it is probable that from three to five rooms will be started on each side at the same time. This will insure better protection in the completion of the panel, and the rooms will provide a larger tonnage which may more than offset the smaller tonnage for headings without rooms.

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When Sealing a Mine Fire Should Inclosed Area Be Big or Small?

Including Already Mined Area Within Inclosure Dilutes the Methane Which Comes From Active Workings and From Fire, Provided the Mined Area Has Been Ventilated—Also Augments Inert-Gas Volume

SOMETIMES it is possible to choose how much territory shall be included in the area within which a mine fire is to be sealed, yet no one seems to have attempted to determine whether or under what circumstances a large or a small area should be chosen for sealing. Probably the subject hitherto has received insufficient consideration because some essential fundamental factors involved have not been sufficiently studied. For instance, we do not know with any assurance just what gases are evolved by a sealed fire and whether coal or props continue to form inert gas when, at atmospheric pressures, there is a marked deficiency of oxygen.

There are both advantages and disadvantages in the sealing of a large area. These must be balanced against each other in every instance, and a decision rendered. Knowing the conditions and their implications, perhaps something can be done to avoid those factors which would make sealing more dangerous or less effective than it otherwise would be, and to prepare all or a part of the area to be sealed for that operation by an intensive preparatory ventilation.

Methane Dilution

Two advantages of inclosing a large area when an ordinary mine fire, not a spontaneous fire or "goaf stink," is to be fought by sealing are:

(a) *Largeness of Area Dwarfs Methane*—In any mine, the area that has been exhausted of its coal greatly exceeds that which is being actively mined, and only a small part of any large sealed area will consist of active, or recently active, workings in which coal is being broken and from which pillars are still discharging maximum quantities of methane. Therefore, when the area inclosed is large, if both the already mined portion of it and the actively operated portion have been ventilated, the area immediately after sealing should have less methane than it would have if only the active portion were sealed.

It has been shown experimentally, and it is well recognized, that freshly mined coal faces and coal crushed by shooting or otherwise give off more methane than old coal faces and than coal which has not been crushed or broken. Thus methane, like coal is dislodged, or "mined," when coal is brought down, and in addition methane "bleeds" freely whenever a new coal face is exposed.

Because the working area emits more methane than what might be termed the "static," or mined-out, area, a big inclosure with a large static area that has been ventilated will be slower in becoming dangerous than a smaller area, and by that time (1) the combustion of coal and combustible gases by the fire, (2) the absorptive attachment of oxygen to the coal faces and (3) the lowering of the oxygen content by its surface reactions with the coal substance resulting in the formation of carbon dioxide, carbon monoxide and perhaps other gases may so reduce the oxygen content of the behind-the-seals atmosphere as to make the firedamp resulting inexplosive.

Nearness of Methane

An important consideration is the relative nearness of the fire to the methane, especially that gas which lies to the rise, because methane emitted or pocketed at points distant from the fire will diffuse slowly and travel sluggishly and so may be in much higher concentration at points remote from the fire than within the immediate fire area. Especially will a body of methane pocketed above a roof fall be slow to add its quota to the general methane content. However, if the area to be sealed is passing air "across lots," so to speak, it may move the methane readily, speeding up the critical moment when the methane will reach the fire in such proportion as to be explosive unless the air with which it is mixed is so oxygen-depleted as to be incapable of a sustained ignition of the mixture.

Cross-Lots Ventilation—To prevent such cross-lots passage is a primary duty in sealing, and it is best done by so disposing ventilation that all the sides of the sealed area will have, as nearly as possible, the same barometric pressure. It is the part of major strategy to plan in detail for this provision before a switch is made from direct fire-fighting to fighting fire by seals. No devout purpose to equalize air pressures will serve prior to sealing. A distinct plan must be evolved that, as far as possible, is calculated to effect that result.

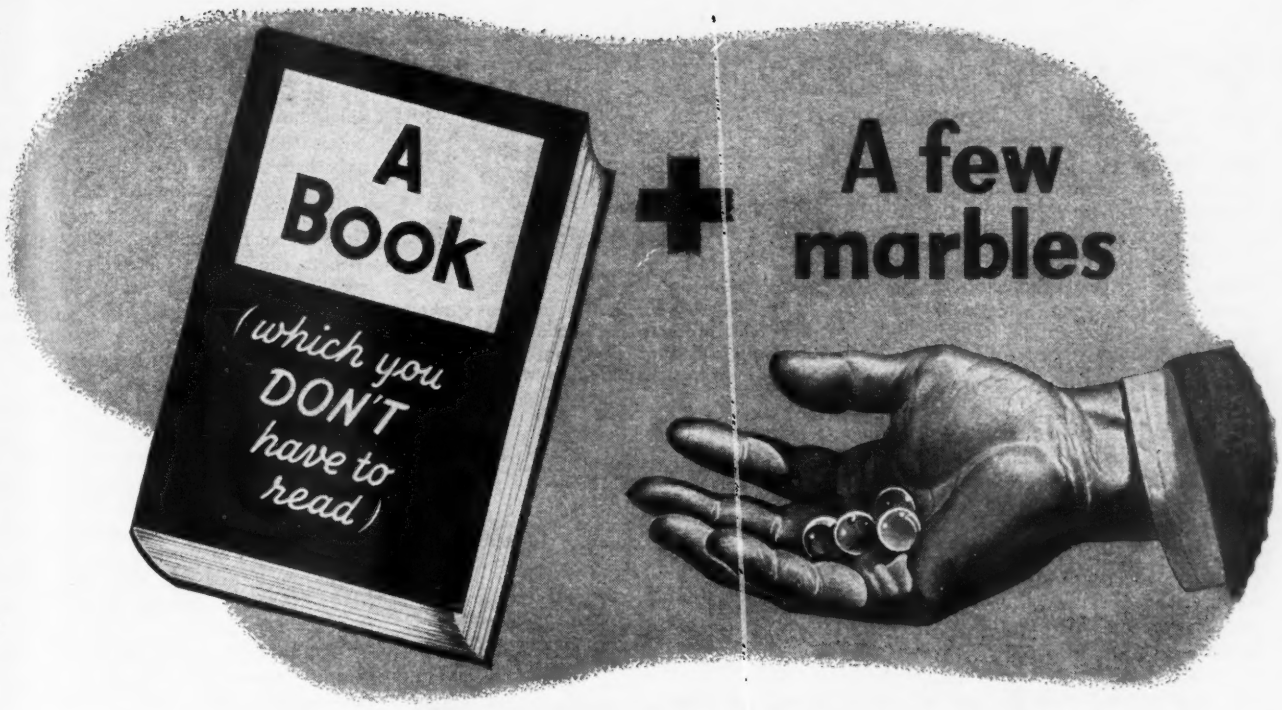
It is a distinct advantage to have the fire in any sealed area at a lower elevation than the goaf or the working face. But this is true only of a sealed fire area. When the fire has not been sealed, the flames from it are likely to travel up toward the methane, if the methane is occupying the higher ground, and the risks in this case are increased, though the return from an active fire must be so contaminated by the carbon-dioxide products and the nitrogen from the fire that even in this case no explosion may occur even if the flames travel so far.

As most workings are driven uphill, the methane in most sealed areas will be away from the fire and will travel farther away from it rather than approach it, and, after *effectual* sealing, the accumulated methane cannot travel except in response to its gravity and to changes of pressure or temperature that move in unison both methane and the gases associated therewith.

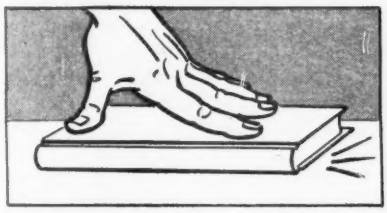
So Slow, May Not Fire at All

In consequence, in a large area, it is likely that if the sealed goaf has been effectively ventilated prior to the occurrence of the fire, or has been well ventilated shortly before sealing, the critical period when the methane percentage at the fire will become sufficient to explode will be so delayed that the air by that time will be too inert to explode it. This will give the sealing gang more time to accomplish its task and perhaps even time to complete the sealing in a final and efficient manner, but with a large inclosure that time may not suffice because the number of openings may be greatly increased, and the seals will have to be more explosion-resistant, because the larger the volume of methane behind the seals (if well distributed) the more violent the explosion, should it occur (other factors being equal).

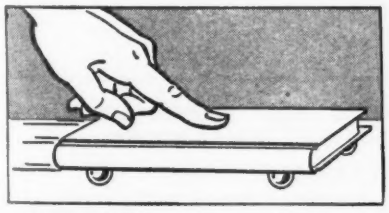
(b) *Largeness of Area Increases Volume of Inert Gases*—Information is lacking for any dogmatic declaration regarding the effect of inert gases. R. T. Chamberlin, in "Notes on Explosive Mine Gases and



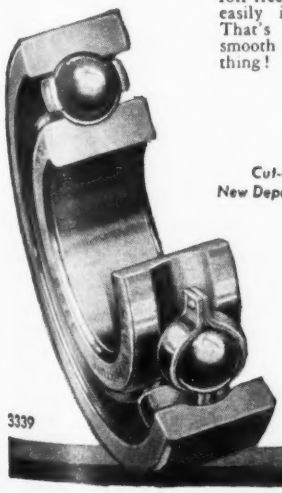
tells the WHY of Ball Bearings



TRY THIS: Place a book on your desk and your hand firmly on it. Then try to push the book across the desk. That's the principle of *sliding motion*—hard on book, desk and energy.



THEN THIS: Place 4 marbles under the book, your hand on top—and push. The marbles roll freely, the book moves easily in any direction. That's *rolling motion*—smooth and easy on everything!



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Dusts," U. S. Geological Survey, Bulletin 383 (1909), shows, p. 29, that when coal from Monongah mine, Monongah, W. Va., was broken in a rock crusher so as to pass through a 10-mesh sieve and then bottled in a vacuum and analyzed after 6 weeks, the volume of carbon dioxide relative to the original volume of the coal thus treated was 0.019. After a further 10 weeks, the relative volume of the gas was down to 0.002, but after a further 10 weeks it had risen to 0.018.

Liberation Sequence

Apparently, the first effect of crushing is to release physically held carbon dioxide. After that, because the reaction in Chamberlin's experiment occurred in a vacuum, the carbon dioxide released in this instance probably is the result of a chemical change in the coal, not a combination of some of the coal constituents with atmospheric oxygen. The reaction which results in the generation of carbon dioxide is not a surface reaction but is "autogenetic"; that is, it occurs within the coal substance itself. This seems to be suggested from the following considerations: The relative volume of carbon dioxide to the original coal volume after the coal has been kept for six weeks in a vacuum is 0.019. The crushing to which it was subjected released much of the physically held carbon dioxide, and 0.019 escaped during the vacuum of six weeks' duration that followed. Held in a vacuum for ten weeks longer, some carbon dioxide (0.002 volume) was obtained. The origin of the carbon dioxide that escaped from the coal during this second period is not clear. Some may have been adsorbed carbon dioxide (being attached to a surface, as is paint or whitewash); some may have been occluded carbon dioxide (soaked up like a liquid into infinitesimal pores) and some may have been carbon dioxide generated by a change within the coal substance. In fact, some of the carbon dioxide liberated in the first six weeks probably was self-generated (autogenetic) also. In the next ten weeks, the relative volume of the carbon dioxide had been stepped up to 0.018, almost as much as was liberated in the first six weeks of isolation in a vacuum.

Chamberlin shows, however, that the content of carbon dioxide in the gas that collected in the bottle after the first (six-week) interval was 2.00 percent. After the next ten weeks it was only 0.82 percent, but after the following ten weeks it was 15.27 percent. These are not cumulative figures; they represent liberations during the first six weeks, and the second and third ten weeks.

Unfortunately for those attempting to formulate a principle regarding the action of coal in air, the figures are based on the escape of carbon dioxide in a vacuum, whereas, for the purpose in hand, figures for action at atmospheric pressure and in presence of air are desired. Then again the analyses were made by two different methods which might not check satisfactorily, one being made of the gas after the six-week interval, using the usual technical method of Hemple, and the other two analyses being made over mercury and

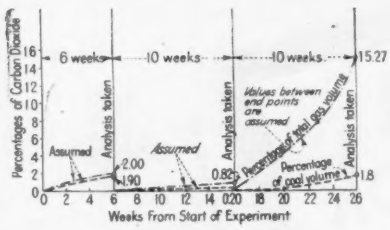

Fig. 1—Non-cumulative analyses show how methane emission declines and, except immediately after crushing, how carbon dioxide liberation increases with time (see Table I).

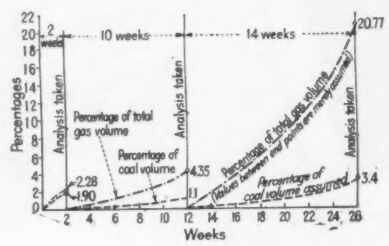

Fig. 2—Without crushing, non-cumulative analyses show a big drop in carbon dioxide and methane followed by recovery in carbon dioxide and a falling off in quantity of methane (see Table I).

using the apparatus described by Bone. But this seems clear: Between the last two analyses, both of which followed Bone's method, there was a marked increase of carbon dioxide, which indicates self-generation ("autogenesis"), not mere liberation from the surface or the interior.

Another experiment used a sample from another part of that same Monongah mine. The first period was two weeks, the second ten and the third fourteen. The relative volumes were 0.019, 0.011 and 0.034. The percentages were 2.28, 4.35 and 20.77. These results are the same in kind, if not in quantity, as those taken from the other part of the same mine.

As might be expected, the figures given on p. 26 of Chamberlin's bulletin for small lump coal do not agree with those where the coal is crushed finer, and probably had larger lumps of coal been taken a larger divergence would have appeared. The loss of physically held carbon dioxide from a coal face probably takes some time. When the coal is crushed, the loss is speeded so much that the action of coal in creating carbon dioxide by "autogenesis" can then be detected in a short period of experimentation. With coarser coal the liberation of physically held carbon dioxide probably continues until after a mere half-year-long experiment has ended. In mine ribs, the liberation of physically held carbon dioxide probably continues even longer than it does in small lump coal.

The evidence that coal gives out increasing quantities of carbon dioxide with the passing of time, if the early loss of physically held carbon dioxide is overlooked, seems to be backed satisfactorily by Chamberlin's experiments. It might be more conclusively proved by a method that would exclude the vacuum and give the coal an opportunity to react with the atmosphere. The percentages shown by Chamberlin for carbon dioxide at the several periods seem at first sight much more conclusive than the relative volumes which he calculated, but percentages of carbon dioxide in a gas mixture do not indicate any definite increase or decrease of carbon dioxide emission unless the gross quantities of emitted gas are considered. At the end of the three periods in the first experiment, the percentages of paraffin gases (mostly methane) were respectively 55.99, 64.31 and 47.31, and the decline in the last figure boosts the percentage of carbon dioxide, as has been noted. The quantities also are being even more reduced being in that experiment 96.7 percent of the volume of the coal in the first six weeks, 26.2 percent in the next ten weeks and 12.2 percent in the latter ten weeks, as the table shows.

TABLE I—ANALYSES OF GASES ESCAPING FROM CRUSHED COAL BOTTLED IN VACUUM WITH RELATION TO COAL BY VOLUME

FIRST EXPERIMENT

	First 6 Weeks		Next 10 Weeks		Next 10 Weeks	
Gas	Percentage of Total Gas	Percentage of Coal Volume	Percentage of Total Gas	Percentage of Coal Volume	Percentage of Total Gas	Percentage of Coal Volume
Carbon dioxide	2.0	1.9	0.82	0.2	15.27	1.8
Carbon monoxide	0.20	0.2	0.16	....	2.86	0.4
Olefins	0.29	0.3	0.27	0.1	0.55	0.1
Paraffins (mostly methane)	55.99	54.2	64.31	16.9	47.31	5.8
Air { Oxygen	0.18	0.8	8.56	2.2	2.7	1.9
Air { Nitrogen	0.68		25.88	6.8	12.91	
Nitrogen (excess)	0.66	39.3	.....	....	18.40	2.2
	100.00	96.7	100.00	26.2	100.00	12.2

SECOND EXPERIMENT

	First 2 weeks		Next 10 weeks		Next 14 weeks	
Gas	Percentage of Total Gas	Percentage of Coal Volume	Percentage of Total Gas	Percentage of Coal Volume	Percentage of Total Gas	Percentage of Coal Volume
Carbon dioxide	2.28	1.9	4.35	1.1	20.77	3.4
Carbon monoxide } Olefins	0.79	0.7	1.54	0.4	13.35	2.2
Paraffins (mostly methane)	62.57	53.5	30.51	7.6	41.77	0.9
Air { Oxygen	0.12	0.5	*12.38	14.8	0.15	
Air { Nitrogen	0.45		*46.85		0.57	
Nitrogen excess	33.79	29.0	4.37	1.1	23.39	3.8
	100.00	85.6	100.00	25.0	100.00	10.3

*While the gas was being pumped out a leak unfortunately appeared in the tubing connecting the vacuum bottle with the exhaust pump.

GOOD TO THE LAST HAUL

Our experience in building conveyor belts for highly specialized types of service covers a wide range of operating problems and enables us to guarantee that BWH belts give exceptional service.

BWH conveyor belting, made by the Rotocure Process of Continuous Vulcanization, is uniformly vulcanized, uniformly stretched, and will be uniform in service. Maximum efficiency and minimum cost in actual use are the first considerations in the manufacture of BWH belting.

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State-Board Questions

Firebosses, Indiana

How to Find Methane

Q.—How does the non-luminous flame of a safety lamp indicate the presence of methane?

A.—After the flame has been shortened by lowering the lamp wick until the flame is almost extinguished, note is taken of the height of the blue flame or "cap" by which the lamp flame is surmounted. This cap is blue because it is not derived from the burning of the oil in the wick, because that gives a yellowish flame, but from the combustion of the methane in the firedamp. Its height above the oil flame is dependent therefore on the percentage of methane in that gaseous mixture.

Weight Change in Surface Air

Q.—What changes in the atmosphere can be detected with the flame safety lamp?

A.—One can note when the weight, and therefore the pressure, of the air above the earth's surface increases by the fact that around old gassy workings the flame of the safety lamp shows no cap, for the pressure is communicated to the air underground, and this pressure drives the air in the old workings back from the headings, leaving only the pure intake air both in the heading and in the room necks.

When the mercury in the barometer (which balances the weight of the air with a weight of mercury) rises from 30 in. of height to 31 in., then the area occupied by the room air decreases one-thirtieth. But as the distances between room centers is, say, 50 ft. (see Fig. 1) and the width of the neck is, say, 8 ft., if the area occupied by that air shrinks a thirtieth of 300 ft. (the supposed length of the room beyond the neck) the air will move forward in the wide part of the room 300 ÷ 30 = 10 ft, but if it does it will have to move 50 ÷ 8 times as far in the neck, or say 6 times 10, or 60 ft., if the neck is that long.

If the neck is only 30 ft. long (see Fig. 2) the good air will travel into the neck 30 ft. and into the wide part of the room a further 5 ft. and, for those 35 ft. you probably will find air that will fail to show a cap, unless there is some mixing or some diffusion, for gases will mix when disturbed and will diffuse into each other even without any disturbance.

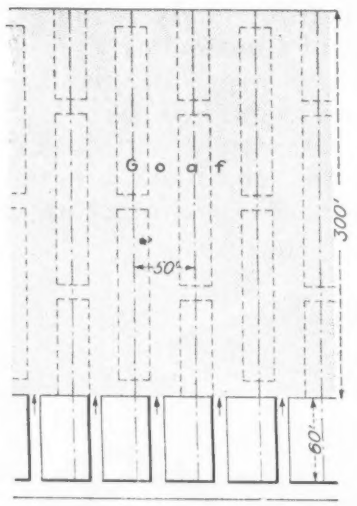
If, however, the weight of the surface air decreases, the mercury in the barometer will fall, and the pressure of the air in the headings and in the rooms also will decrease, so the air in the old workings will expand and push out some of their air, and as this air is methanous a cap may be seen on the flame of the lamp if brought into that atmosphere. In fact, this methanous air will fill as great a length in the heading as the fresh air formerly filled in the 60-ft. room neck, if the cross-section of the heading equals that of the room neck and provided the barometer falls as much as it formerly rose.

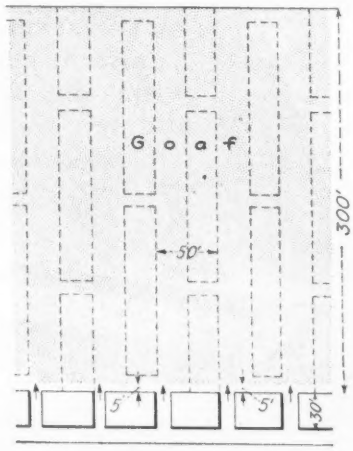
But as there are several room necks, all of them easing their excess air into the heading, all putting out, say, 60-ft. slugs of methanous air, much air now will have to move out of the mine. Because, however, the change in pressure is slow, the air is leaving only in small quantities at a time, so that, even if air is not sweeping the roadway, the methanous air coming out of the room will be mixed with the intake air. High-barometer air does not normally mix gases, but low-barometer air does.

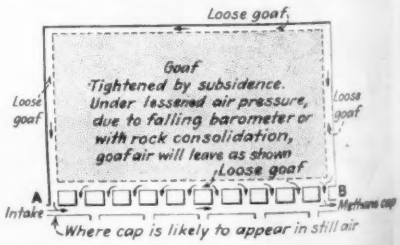
In this exposition, the assumption is made that the expansions and contractions of the air in the rooms are along the axis of the room, but they may be obtained by passage of air at right angles to the room axis, the air passing through crosscuts or, in the case of caved workings, along the edges of the goaf, where the goaf is loose, to escape, in the event of an expansion, in large bodies at the outby and inby edges of the goaf. It is probable that the goaf discharges its methane in all three directions, but, if the goaf is tightened by subsidence, the greater part of the methanized air may leave at A and B (Fig. 3).

Weather and Gas Caps

Low air pressures are due to the presence of water vapor in the surface air, for the vapor of water is lighter than air, and the light moisture displaces some of the air and this makes the mixture light. Moisture forms rain, so lamp caps, which are found with low air pressure (low barometer), quite frequently appear in rainy weather.







When pressure of air increases, intake air is pushed into room necks.

Fig. 1—With 1 in. rise of barometer, intake air will fill the 60-ft. neck of a room 360 ft. long.

Fig. 2—With the same pressure rise, fresh air will fill a 30-ft. neck and edge into the goaf 5 ft.

Fig. 3—Loose goaf provides easiest way of escape of excess air where goaf air expands.

* Continued from December, 1944, *Coal Age*, p. 116.

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Bright Day	Dull Day
Heavy dry air gives high barometer, makes goafs contract, so air enters goaf and lamp has no cap	*Light moist air gives low barometer, makes goaf expand, so air leaves goaf making gas cap on lamp*

Bright days go with heavy or high-pressure air, so caps are less frequently present when the days are bright and sunny than when they are dull. Look for rain and methane on the same day. On bright days you are far less likely to have trouble by methane escaping from old workings.

However, right up at the working face where the methane comes directly out of the coal and not out of the goaf, the pressure which forces the methane out of the coal is so much greater than the changes in air pressure that the latter has hardly any effect. For this reason, at the working face, methane and caps are as likely to be found in fine weather as in foul.

Q.—What causes explosions in coal mines?

A.—Combustion of methane, of coal dust, or of both. Coal dust is more easily fired if methane is present, but either coal dust or methane by itself can burn or explode.

Causes of ignition include:

1. Electricity—trolley and rail arcs where bonds are imperfect or missing, short circuits, severed cables, cable blowouts, electric switch arcs, falling of trolley wires and of signal wires that cause electrical contacts. Other electrical causes might be enumerated.
2. Open-flame lamps.
3. Flame from the explosion or the burning of black blasting powder.
4. Mine fires.
5. Pipe and cigarette smoking.
6. Blow-out shots.
7. Flame safety lamps when relighted or opened outside established stations.
8. Defective safety lamps—improper assembly or defective gauzes.
9. Sparks from main or auxiliary fans.
10. Spontaneous combustion of oil.

All these and some other causes may ignite either methane or air-suspended coal dust, but some of the causes instanced will both scatter and ignite coal dust. Usually, when there is an explosion, methane is first ignited, and the violence with which it explodes raises the coal dust, which then explodes, but coal dust can be ignited even when there is no methane to start it burning.

Coal dust can be suspended also: (1) in taking down dust-laden timbers, (2) by windy shots, (3) by heavy rock or coal falls, (4) by over-rapid air currents, (5) by leaky cars, (6) by cars overloaded with coal dust, (7) by car derailments, (8) by electric blow-outs, (9) by sliding of dust on steep pitches, (10) by air passing over loaded conveyors, (11) by breakage of conveyors with dumping of dust, (12) by the chuting of coal dust or dusty coal, (13) by loading coal or road cleanings, (14) by discharge of shuttle cars and (15) by travel of same.

Coal Age Quiz*

Finding Scale of a Map

Q.—On a map, 6.25 in. represents 500 ft.; what is the scale of the map?

A. — Because 6.25 in. represents 500 ft., 1 in. represents $\frac{500}{6.25}$ ft. = 80 ft.

Thus, there is 1 in. in the drawing for every 80 ft. on the ground, and the scale is 80 ft. to the inch.

Rule is: $\frac{\text{Length to be represented}}{\text{Actual length on map}}$ = number of feet to inch

Length on the Level

Q.—Given the length of a line measured on a slope, and given the inclination of the slope in degrees as measured from the horizontal, how would you figure how long the line would be as projected on a horizontal plane?

A.—Multiply the length as measured on the slope by the cosine of the angle at which the slope rises from the horizontal and you will have the horizontal projection or the length on the level. The value of the cosine of the angle can be obtained from tables. Suppose the length is 200 ft. and the inclination 60 deg., then the horizontal projection will be 200 × cosine 60 deg. = 200 × 0.500 = 100 ft. (see Fig. 1). If you have only a "Latitude and Departure Table," you will find that the latitude for 1 ft. is the same as the cosine for the same angle, so instead of saying horizontal projection = 200 × cosine 60 deg., say = 200 × latitude = 200 × 0.500. Latitude means the alongside measurement. It gives the measurement on the other or basal limb of the angle (see Fig. 1). Remember, the cosine always snuggles up to the angle being considered.

Rise From the Level

Q.—Given the length of a line measured on a slope and given the inclination of the slope in degrees as measured from the horizontal, how may the rise be calculated?

A.—Multiply the length as measured on the slope by the sine of the angle or by the departure, which is the same thing. Suppose the length is 200 ft. and the inclination 60 deg., then the vertical rise will be 200 × sine 60 deg. = 200 × 0.86603 = 173.206 (see Fig. 1). The departure shows how far the point *B* has departed from the horizontal line in traveling 200 ft. from A, and the sine shows the same figure. Remember, the sine always boldly faces the angle considered.

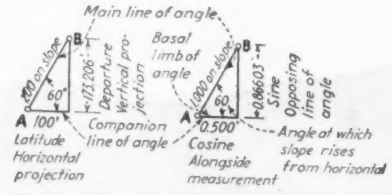


Fig. 1—Cosine discloses travel alongside companion line of angle; sine gives travel away from companion line of angle.

Distances on Plans

Q.—What is a plan view?

A.—A plan view is the projection on a horizontal plane of an imaginary model of an area constructed to scale. Suppose a point in a mine is designated A, then on the plan view the point *A* will be placed on a horizontal plane vertically over or under an imaginary model of the mine molded to represent to scale the actual shape of the mine.

If there are two points *A* and *B*, the distance between them in the plan view may not be the same as those in the imaginary model, for the plan is not drawn to show the distance between the points *A* and *B* but the projection of that distance on a horizontal plane. Only when *A* and *B* in the mine are on a horizontal plane will the distance between *A* and *B* in the plan view be the same as that in the mine.

However, it is usual when surveying not to measure and therefore not to record the true distance between *A* and *B* but only the length of the projection on a horizontal plane, so when the map is made the distance used for plotting and the distances recorded are not actual

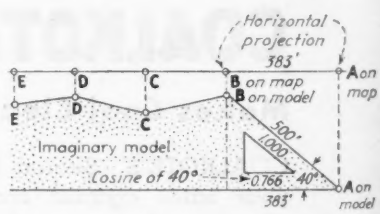
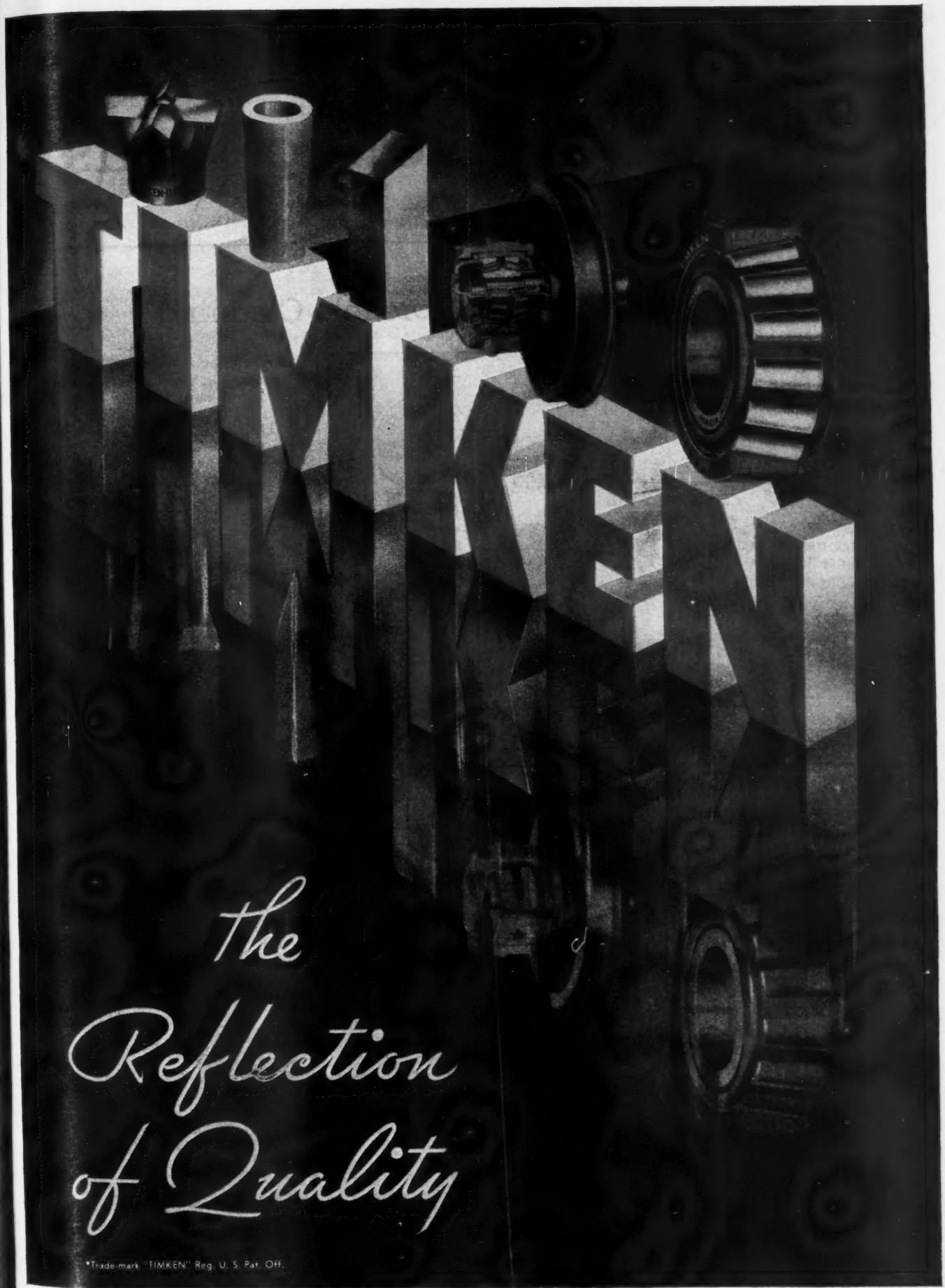


Fig. 2—A plan view shrinks all distances to their horizontal parts or components.

distances but the distances of the projection on a horizontal plane. If, for instance, the coal is pitching 40 deg. and the actual distance between *A* and *B* measured on an even slope is 500 ft. (see Fig. 2), then the distance between the points *A* and *B* on the map will be 500 × cosine 40 deg. = 500 × 0.766 = 383 ft. and that in all probability will be the figure recorded on the map and not the actual distance.

Strictly speaking, maps are not made to give correct distances but only distances between points on a horizontal plane and, where mines dip or rise heavily, the distinction is considerable, as is shown in the example given. The cosine of an angle varies from 1 to 0, 1 being the figure when the coudse between *A* and *B* is horizontal and 0 being the figure when *B* is vertically over *A*. Then on the map, if the cosine is zero, *A* and *B* will be at identically the same point, though the points actually are 500 ft. apart.

* Continued from January, 1945, *Coal Age*, p. 104.



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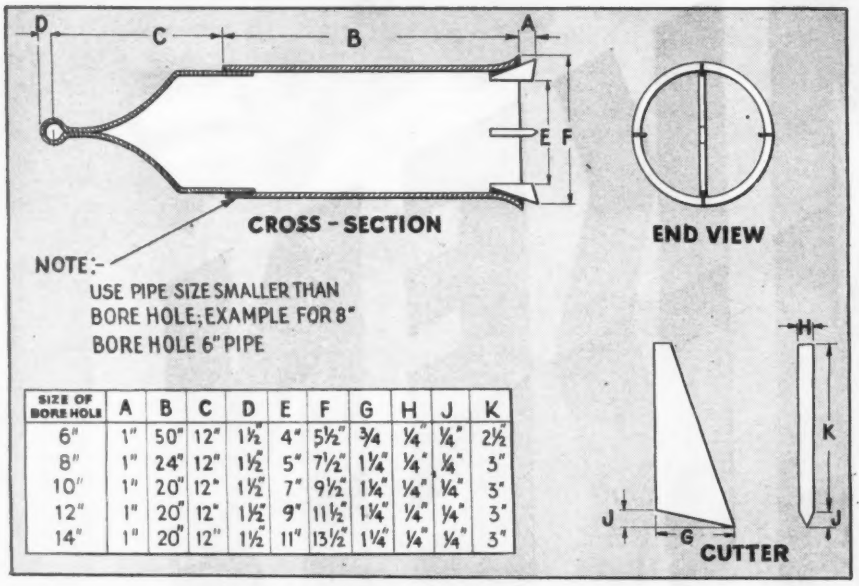
Operating Ideas

Cleaner Cheapens Borehole Cleaning



SIZE OF BORE HOLE	A	B	C	D	E	F	G	H	J	K
6"	1"	50"	12"	1½"	4"	5½"	¾	¼"	¼"	2½"
8"	1"	24"	12"	1½"	5"	7½"	1¼"	¼"	¼"	3"
10"	1"	20"	12"	1½"	7"	9½"	1¼"	¼"	¼"	3"
12"	1"	20"	12"	1½"	9"	11½"	1¼"	¼"	¼"	3"
14"	1"	20"	12"	1½"	11"	13½"	1¼"	¼"	¼"	3"

A PIPE CLEANER which materially reduces labor for cleaning boreholes has been devised by George Whirlow, Somers mine, Pittsburgh Coal Co., Pricedale, Pa.

The cleaner, detailed in the accompanying sketch for pipes 6 to 14 in. in diameter, can be made in the shop for about $10. The cutters, four to each device, are welded to the bottom of the cylinder.

To give some idea as to what this device has meant in the way of speeding up the cleaning operation, it is stated that a 10-in. borehole was cleaned in 9 man-hours. Furthermore, it is believed that savings in power will result at most mines if boreholes are cleaned periodically.

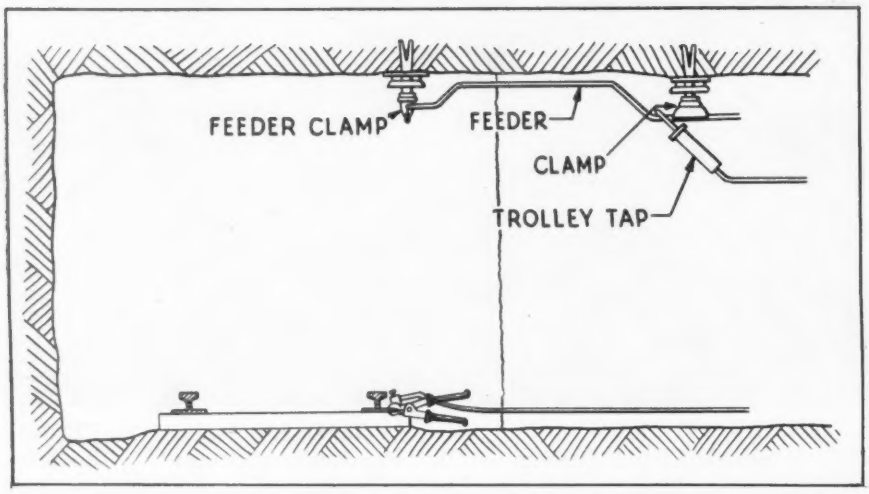
Chart shows how the dimensions of the parts for the cleaner vary with borehole pipe sizes.

Station for Trolley Tap

A BETTER WAY of connecting a fused trolley tap to the overhead system at a room neck or butt entry is described in a recent issue of *O-B Haulage Ways*.

The suggested arrangement, as shown in the accompanying diagram, consists of a short length of feeder cable which is carried from the trolley to a convenient location at the side. Attachment to the trolley is made with a feeder clamp and it is suspended from the mine roof in the entry by a feeder sling or a trolley-wire clamp.

In this way it becomes a simple matter to hook the fused trolley tap over the supplementary length of feeder and thus provide power for face machinery without disturbing traffic on the haulage system.



Ground connections for the face machinery may be made directly to the flange of the rail or a rail-bond cable by means of a plier-type ground clamp. If desired, a short length of cable may be permanently attached to the rail and carried to a convenient location on the rib near the tap connection. This, however, is not absolutely necessary, as the plier-type ground clamp does not in any way interfere with traffic on the haulage system.

Plier-type ground clamps are stated to be a lot faster than twisting the ground lead onto a bond cable—and provide a much more positive connection. Heavy bronze clamping jaws grip the rail or bond cable in a tight, vibrationless connection. The clamps are provided with comfortable rubber handles to protect the operator from electrical shock in case of improper hook-up sequence.

Hooked to jumper, trolley tap is out of the way of locomotives and other equipment.

Washing Coal with HYDROSEAL PUMPS

Recirculation of sand or sludge in cones or other hydraulic coal cleaning equipment is only one of the many money- and trouble-saving applications of Hydroseal Pumps in coal mines. Others include, (1) the pumping of tipple or breaker refuse or silt to storage pile or fill, (2) pumping coal in the moving of storage piles, to distant locations for storage or from mine to preparation plant, (3) reclaiming culm banks, (4) pumping overburden in hydraulic stripping operations, (5) cleaning muck from reservoirs, underground sumps, shaft bottom sumps and air shafts. . . . Photograph shows a D-Frame Hydroseal Pump which pumps water containing 7.5% solids into the Constant Head Box of a Koppers Rheolaveur. . . . The Hydroseal Principle of using clear water to keep abrasive solution from leaking back to the suction, plus Maximix Rubber which greatly outwears metal in the pumping of abrasives solutions assures low cost pumping under the most difficult conditions. Thousands of installations prove it. . . . Send for our 32-page Catalog No. 140 and learn what you can expect nowadays in abrasives pumping. Then, ask us to send one of our pump engineers to discuss your problems.

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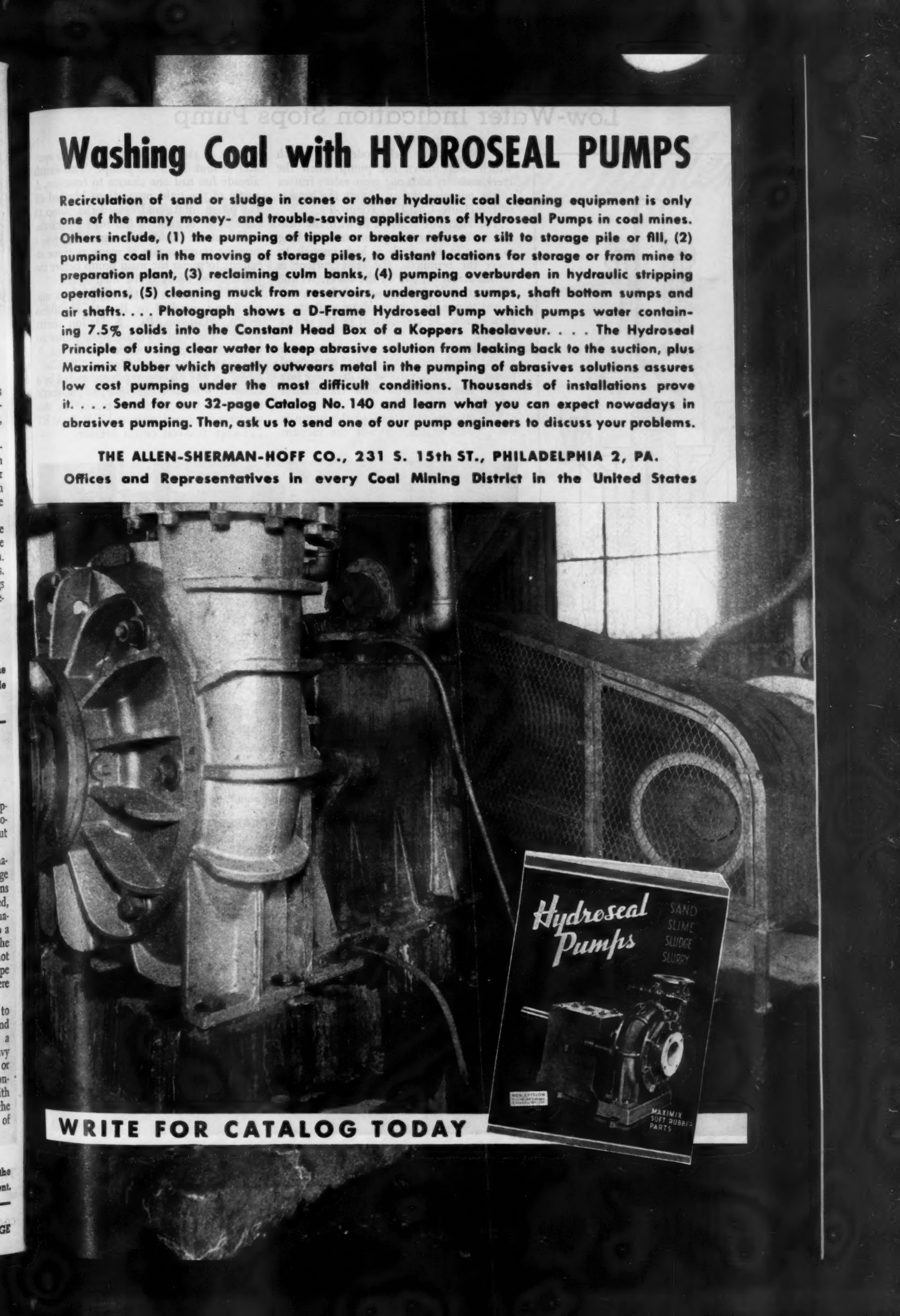
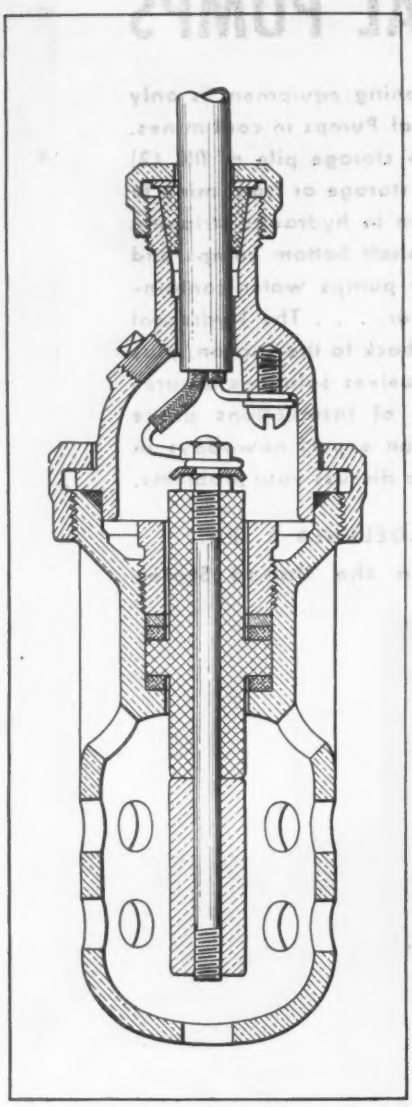
Offices and Representatives in every Coal Mining District in the United States



WRITE FOR CATALOG TODAY

Low-Water Indication Stops Pump



Electrode device is used to shut down the pump when the water is low in the creek.

AN IMMERSIBLE electrode-type switch which shuts down the pump when the creek runs dry adds one more safety feature to the pumping station serving the breaker of the Hauto Coal Co., Hauto, Pa.

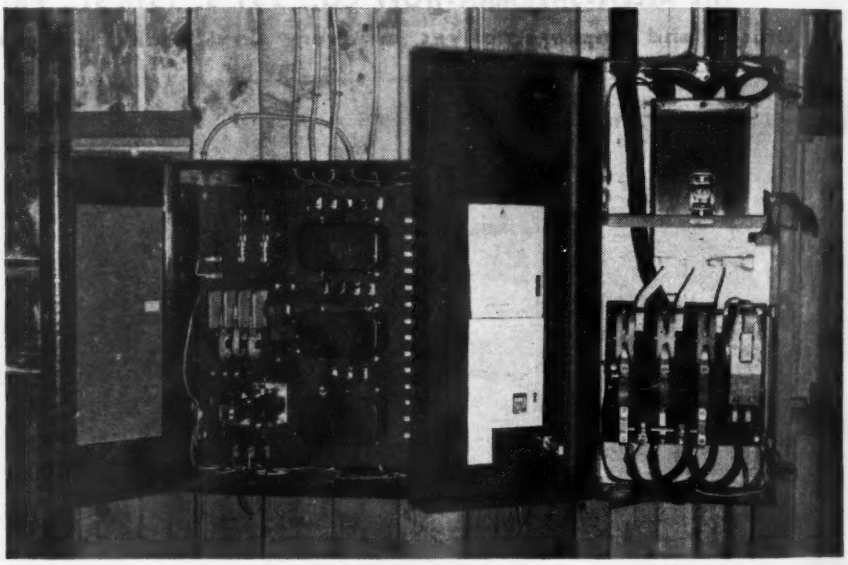
The electrode is wired in with the control circuit of the pump's starter. As long as water in the creek is high enough to cover the terminals, the relay current is carried across the gap by the water. While this current is small, it nevertheless is sufficient to operate a relay, whose contacts in turn handle the coil current of the starter proper.

Besides the protection against low water in the creek the 1,000-g.p.m. centrifugal pump has a check valve in its discharge line which also is tied in with the control circuit.

Still another protection to the pump is the vacuum switch. When the vacuum reaches an alarming point, this switch operates to shut down the pump. This switch already has had one chance to function. A turtle of the right proportions blocked off the pump intake and caused the pump to shut down because of too high a vacuum.

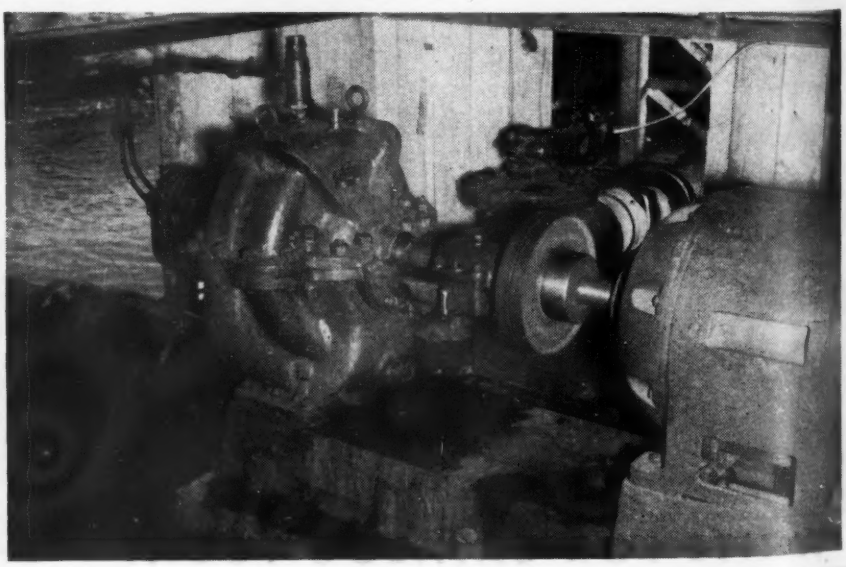
When the pushbutton signal is given, a priming pump makes as many as three attempts to prime the main pump before the pushbutton needs to be used again.

The equipment in the station was supplied and installed by Barrett, Haentjens & Co., Hazleton, Pa. A De-Ion starter protects the 3-hp. Westinghouse motor on the priming pump, while the 75-hp. 3-phase 440-volt General Electric "Tri-Clad" motor on the main pump is protected by a General Electric combination magnetic starter. For short-circuit protection this starter is equipped with an I-T-E Type ET 225-amp. 600-volt circuit breaker.



Control equipment: left, timing panel for priming pump; right, starting panel for main pump.

Vacuum and pressure gages tell the story of the pump's operation



Main pump in operation. An electric switch is mounted on the check valve in the discharge line.

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This cross-section shows Anaconda's twin parallel Securityflex cable with self-contained ground wire. This special cable has only slightly increased diameter, so that usual lengths may be handled on standard conductor reels. It offers a simple, convenient method for grounding loaders, conveyors, cutters, etc.

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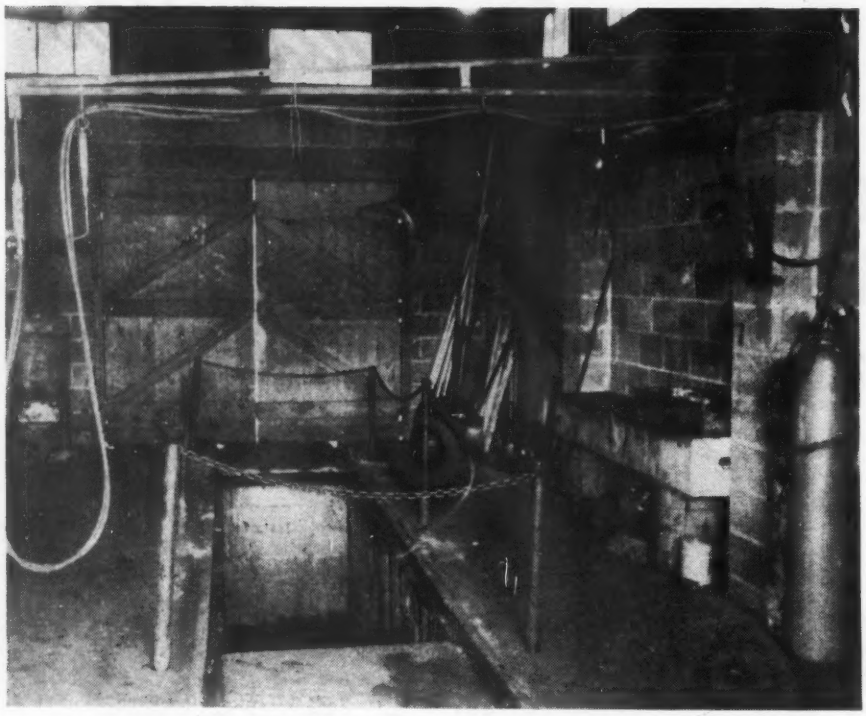
Anaconda Wire & Cable Co.

Welding Hose Carried Overhead on Swinging Boom



SAFETY AND SPACE SAVING are involved in an improvement in arrangement for tanks, hose and torch for gas cutting and welding in a small shop at No. 7 mine of the Raleigh Coal & Coke Co., Raleigh, W. Va.

Oxygen and acetylene tanks with their valves and regulators are chained to the wall so that they will not upset. A pivoted cantilever boom attached to the wall above the tanks supports the hose overhead across the pit track to a point near the center of the shop.

This boom is very light, being made of two pieces of ¾-in. pipe with two cross braces, welded. Four hooks support the hose and at the end of the boom there is a special hook on which to hang the torch that is connected. Another hook accommodates the other torch. The flint lighter also is hung on the boom.

There is danger from upsetting of tanks if they are left standing without support. Placing them against a wall and securing them with a chain is economical of space.

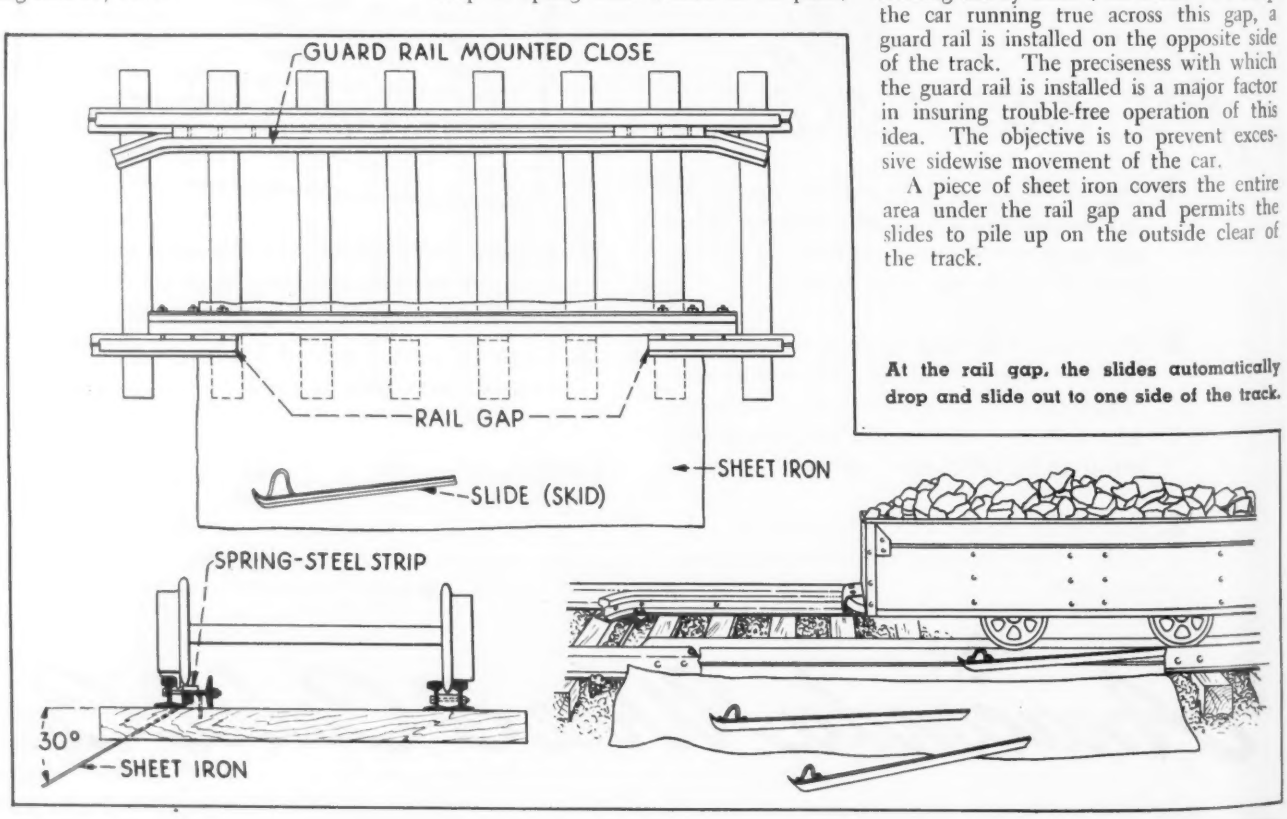
Hose held up out of the way and torch available to a large part of the floor area. Chains supported by posts in sockets guard the pit when not in use.

Slides Drop Out Automatically

REMOVING SLIDES or skids automatically while a trip continues in motion saves both time and power, writes James Scott, mine foreman, Wyatt Coal Co., Eskdale, W. Va., in offering a method of accomplishing that objective.

At the point where the slides are to be removed, a gap is provided in the running rail. To carry the car across this gap another rail, laid on its side and with a portion of the ball cut away and a ¾-in. strip of spring steel welded in its place, provides support for the flange of the wheel in traveling across the gap. The spring steel provides a surface with long wearing life. Each end of this false rail is held in place against the ends of the running rail by three ¾-in. bolts. To keep the car running true across this gap, a guard rail is installed on the opposite side of the track. The preciseness with which the guard rail is installed is a major factor in insuring trouble-free operation of this idea. The objective is to prevent excessive sidewise movement of the car.

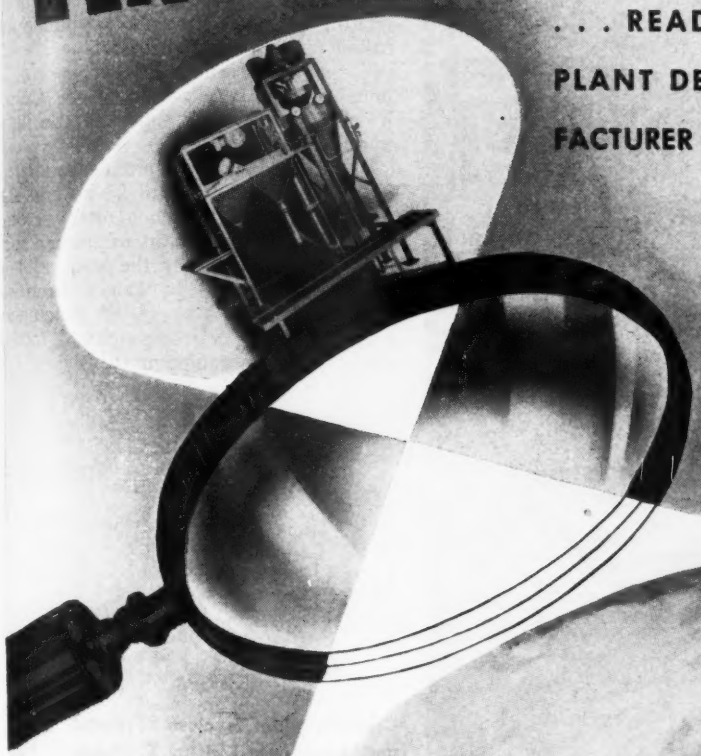
A piece of sheet iron covers the entire area under the rail gap and permits the slides to pile up on the outside clear of the track.



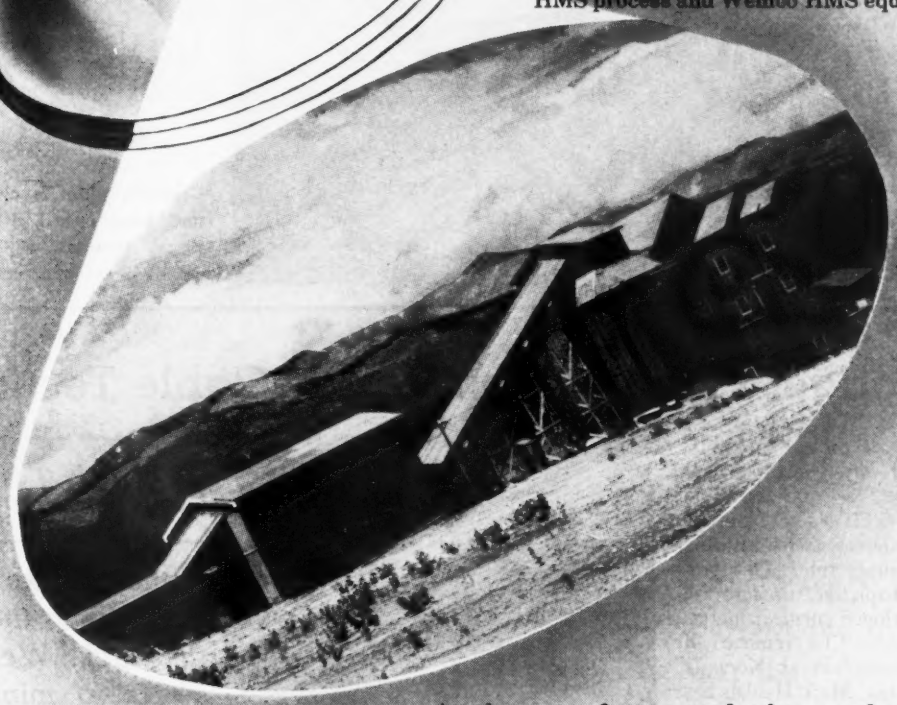
At the rail gap, the slides automatically drop and slide out to one side of the track.

H.M.S. *performance*

. . . READILY PROJECTED INTO FULL-SCALE PLANT DESIGN—WEMCO IS THE ONLY MANUFACTURER OFFERING AN HMS LABORATORY UNIT



The production of this giant plant of the Ore & Chemical Corporation was projected months ahead of time by the use of the HMS Laboratory Unit. The superior production of this plant has been made possible through the use of the teamwork of the HMS process and Wemco HMS equipment.



As the manufacturer who has made the most comprehensive study of the machinery problems found in the application of the Heavy-Media-Separation processes, Western Machinery Company is better able to equip your new HMS plant for coal processing than is any other manufacturer. When you go HMS you will come to know the savings made possible in using equipment designed to the needs of this new process.

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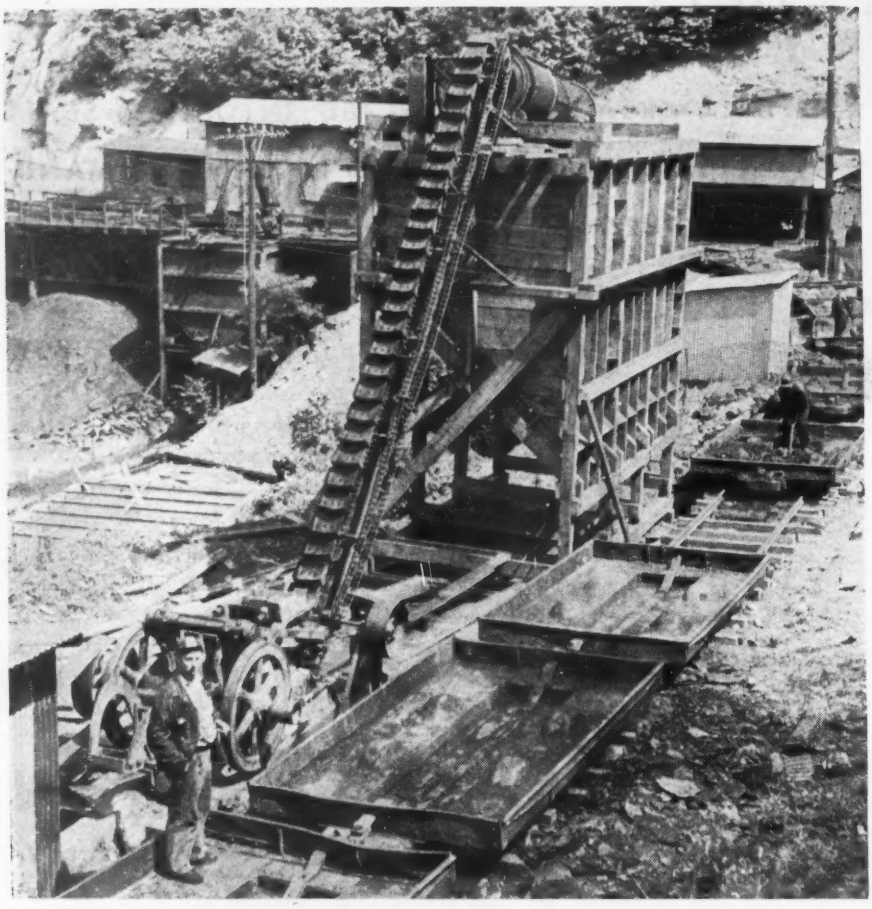
Hard Sandstone From Inside Crushed for Ballast



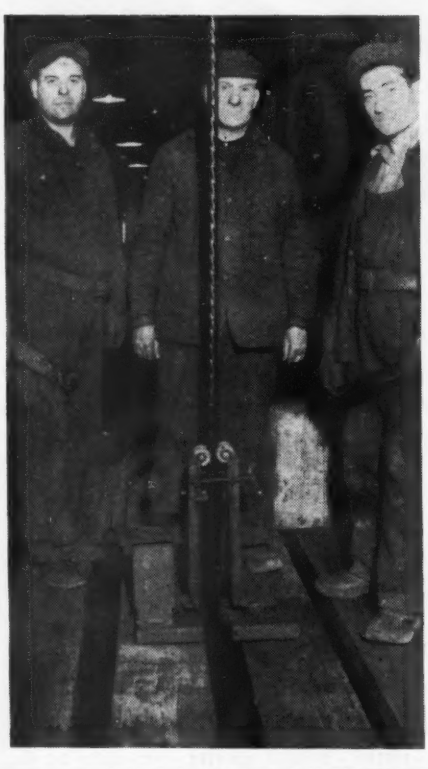
SLATE WHICH CAN BE BROKEN easily with hand hammers or sledges to track ballast size deteriorates quickly and brings repeated expense. Many mines encounter, remove and waste strong rock suitable for ballast. A crushing plant is the answer and the one recently installed at No. 2 mine of the Jewell Ridge Coal Corp., Jewell Valley, Va., is shown in the illustration.

Here a hard sandstone often encountered in the mine is crushed to 2½ in. and the resultant graded through a rotary screen. Unloading from mine cars to crusher hopper is done by hand, but the products flow into the mine cars by gravity from an elevated hopper bin. Used machinery available on the job or purchased locally was employed in equipping the plant.

Crushing plant is close to portal and headhouse. John R. Shortridge, foreman of No. 2 mine, stands in the mine car (lower left).

Gadget Provides Continuous Cable Testing

IN THE INSPECTION of cables, the minimum diameter is an extremely important factor in determining their safety. Routine practice usually consists in stopping the cage or skip at intervals and measuring the cables with a caliper rule. This procedure is somewhat haphazard because the cables may have developed small diameters that would be missed. To remove all chance from this inspection at Noranda Mines, Quebec, Canada, Mark Hanlan has designed and built a gadget that may be made in the shop at little cost. In this gadget, described in a recent issue of *Engineering & Mining Journal*, the cable runs between rollers of proper radius which are clamped to the cable with strong springs and supported by arms mounted on double hinges set at 90 deg. to each other, so that as the cable sways the rollers will follow. The arms have electric contacts that may be set any distance apart, and which will ring a bell at any desired minimum diameter. The gadget is easily set up and has been used at Noranda for the past five years.



Where's Your Answer?

In most books you'll find the answers to the problems in the back. We think the answers to mining problems are important—that's why you'll find them up front in COAL AGE. Speaking of answers—let's have a look at the mechanical, electrical, operating or safety problems you have solved. Mail them in, with a sketch or photo if it will help make them clearer. For each one accepted COAL AGE will pay $5 or more.

Mine equipment earns more, maintenance costs are lower when the Gulf Service Engineer is *"in the picture"*

HERE'S HOW MANY MINES get extra dividends from their investment in mechanized equipment: they give special attention to lubrication and consult regularly with the trained men on Gulf's large staff of Service Engineers.

The scientific lubrication prescribed by Gulf Service Engineers helps keep machines producing more hours each month, cuts maintenance costs to the bone. Mines get other benefits, too, when the Gulf Service Engineer is "in the picture." He helps reduce power costs, improve safety, and lengthen the useful life of equipment.

Make sure your equipment is getting the kind of lubrication that makes possible continuous production, maximum tonnage, and maintenance economies. Write, wire, or phone your nearest Gulf office today and ask a Gulf Lubrication Service Engineer to call.

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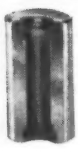
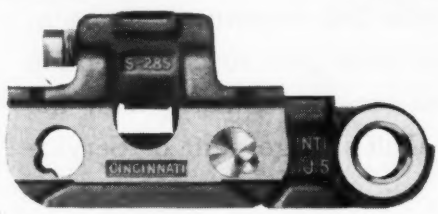
CHECK rising production costs and maintenance repairs with long life, trouble free Cincinnati Chains, Bits and Cutter Bars. Cincinnati Chains and Bits OUTLAST AND OUT CUT them all. Heat treated and perfectly designed and engineered, Cincinnati coal cutting equipment increases production and decreases costs. Keep production flowing smoothly . . . use Cincinnati TIME TESTED Chains, Bits and Cutter Bars.



Hardened Eccentric Pin is designed so it can't turn in block... puts joint wear between pin and insert.

Easily removed heat treated Rivet holds Bearing Pin against longitudinal displacement.

Long life, replaceable, hardened alloy steel Connector Insert gives new factory joint accuracy to a worn connector



Cincinnati Standard Chain accommodates Stanex Holder and Bit or regular ½" x 1" Bit. Similar in design to the famous Duplex Chain.

The Stanex Holder and factory made double end Stanex Bit, fits all chains accommodating ½" x Bits.

THE CINCINNATI MINE MACHINERY CO.

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News Round-Up

Coal Uses Curbed To Meet Supply

An embargo on all freight movement except for war purposes dealt coal production a severe blow in January. Growing out of freight tie-ups as a result of snow and severe weather, the embargo went on at 12:01 a.m. Jan. 27 and was to continue to 12:01 a.m. Jan. 30. Territory involved was that east of Chicago and north of the Chesapeake & Ohio R.R. from Huntington, W. Va., to Potomac Yard, Va. The order was modifiable, however, to permit placement of cars at mines for loading, beginning Jan. 27.

Coming on the heels of other embargoes and restrictions in supply, the order covering the period Jan. 27-30 was accompanied by a SFAW regulation, issued Jan. 25, prohibiting deliveries to consumers with over five days' supply and restricting deliveries to 1 ton or seven days' supply, whichever was greater. Mayors or other municipal officers were given authority over certification of emergency deliveries and other provisions were made for both emergency supplies and modification of the order when conditions permitted.

The embargo also resulted in a change in plans for two Sundays of work in Districts 7 and 8. Officials of the United Mine Workers and SFAW previously had agreed to work on Jan. 28 and Feb. 11. With imposition of the embargo, the dates were postponed to Feb. 4 and Feb. 18.

To meet an "impending coal shortage," James F. Byrnes, Director of War Mobilization and Reconversion, called for a number of drastic steps in early January, including cancellation of conventions, reduction in temperatures in all homes and public buildings to a maximum of 68 deg. F., proscription of outdoor advertising and ornamental and display lighting; elimination of special and excursion trains and any increase in passenger schedules to resort areas, as well as discontinuation of trains on which occupancy of seats and space did not average 35 percent in November, 1944. Mr. Byrnes said a 10 percent reduction in space heating would save about 14,000,000 tons of fuel annually. Secretary of the Interior Harold L. Ickes, Solid Fuels Administrator, estimated that it will be necessary to reduce coal consumption by 25,000,000 tons this year.

Addition of another hour to daylight saving time was said to be under consideration Jan. 17 as a way to reduce further the consumption of electric power and coal to generate it, according to an announcement by Edward Falck, director of war facilities for the War Production Board. He said little saving would be effected by setting clocks ahead another hour. The "brown-out" of non-essential lighting, effective Feb. 1, which he is directing, however, would treat the whole of the United States as a common pool in which surplus power developed by hydroelectric plants would be transmitted as extensively as possible to areas generating power from coal. Thus the surplus from the Tennessee Valley Authority would be fanned out to surrounding regions. Consideration also was being given, he said, to exemption of areas where utilities operate with power generated at Grand Coulee or Bonneville Dam.

Secretary Ickes announced Jan. 10 a SFA order—Regulation 23—prohibiting retail deliveries of slack, nut-and-slack mixtures, mine-run, pea, nut or stoker sizes of bituminous coal produced in Districts 1, 2, 3, 7 and 8 (Pennsylvania, northern and southern West Virginia, Virginia, eastern Kentucky and part of Tennessee) to consumers using 25 tons or more per year having more than 15 days' supply on hand. He also called on operators of large buildings in the eastern half of the country to reduce temperatures to 70 deg. or lower at once. Shippers of coal mined in Indiana were directed on that date to cut immediately their scheduled January shipments to industrial consumers with more than 20 days' supply, thus freezing heavy tonnages for retail dealers and for industries with dangerously low stockpiles.

Amendments to Regulation 23 during January included No. 5, adding "other special-purpose coal" to restrictions on receipts by industrial consumers of "by-product" low-volatile coal produced in Districts 7 and 8. In a directive to producers in District 8 issued Jan. 25, SFAW ordered them to determine commitments to retail dealers in February and March and then ship them no more than 50 percent of such commitments, with the exception of certain size groups.

Regulation No. 24, governing shipments and receipts of "special-purpose" coal (byproduct coke ovens—metallurgical—manufactured gas—chemical processes—beehive coke ovens), issued Jan. 4, permits such shipments only when made pursuant to written contracts entered into on or before Feb. 1, 1945, and which are thereafter filed with SFAW and "specifically approved in writing by SFAW," or shipments and receipts "pursuant to written permission or directions issued by SFAW."

Because of transportation difficulties consequent on bad weather, SFA directed producers in Districts 7 and 8 to ship no

"She wants to clean up—and dust!"

coal after Jan. 10 until the 15th into the area west of Pittsburgh and north of central Ohio, Indiana and Illinois. Two days later a reduction was ordered, between Jan. 15 and 31 in shipments of Illinois and western Kentucky coal to industries having more than 20 days' supply on hand. Shipments of high-volatile soft coal from District 8 in sizes commonly sold at retail were banned to retailers having other coals available in Illinois, Iowa, Minnesota, Nebraska, North and South Dakota, Wisconsin and Missouri in an order issued Jan. 16 by SFA. "SFA," said Mr. Ickes, "will aid dealers in obtaining replacement fuels to the full extent of the available supply."

In response to Director Byrnes' plea, the National Fuel Efficiency Program of the Department of the Interior announced Jan. 18 that it had pledged that volunteer workers and 7,500 large industrial fuel consumers throughout the nation would "cut waste to a minimum and make every pound of coal, every gallon of oil and every cubic foot of gas do more work." Owners and managers of office and apartment buildings, factories, plants, theaters, churches, bakeries and other commercial users of fuel have signified their willingness to cooperate by signing pledges to eliminate waste and inefficiency in the generation of energy. The War and Navy departments, the Public Buildings Administration and other governmental agencies have pledged full cooperation.

Bureau officials reported to Mr. Ickes that the coordinated program to date had resulted in savings as great as 25 percent in fuel consumption in a number of plants and that the over-all goal of NFEP this year was to save 29,0000,000 tons of coal and proportionate amounts of oil, gas and other fuels.

Regulation 25, issued Jan. 20, sets up procedures and controls covering lake coal shipments for the 1945 season and also covers ex-lake dock coal moving to industrial consumers, setting up certain ceilings on quantities that may be contracted for by commercial dock operators, by consumers and all who ship to or via the lakes. It provides for obtaining information by SFA that may be the basis upon which an allocation program can be set up.

A 5-point percentage reduction in anthracite quotas for dealers during February and March was contained in an SFA order on Jan. 22. This meant that, beginning Feb. 1, wholesaler-to-retailer quotas would be 82½ percent of the 1942-43 fuel-base-year consumption instead of the previous 87½. Retailer-to-consumer quotas were unchanged. It was said that plans were under consideration for a further cut to about 80 percent beginning April 1 unless there is increased production or decreased use of anthracite.

•

Bills Provide For Coal Commission

Several bills providing for creation of a National Bituminous Coal Commission as an independent federal agency "for the purpose of conserving the coal resources of the nation" were introduced in the new Congress at Washington the first and second days. One was by Representative Randolph of West Virginia, H.R. 286; another by Representative Cravens of New Mexico, H.R. 383, and a third was by Representative Flannagan of Virginia, H.R. 719.

Representative Dingell of Michigan introduced a measure, H.R. 393, similar in many respects to the others but providing for the creation of a Coal Administration within the Department of the Interior.

Representative Voorhis of California introduced H.R. 102, which purports to amend Sec. 4-II-(i) of the Bituminous Coal Act of 1937, as amended, so as to grant a consumer cooperative, if it performs the functions of a "distributor," the same privileges as were accorded a farmers' cooperative under the 1937 act: that is, discounts from minimum prices.

The Randolph, Cravens and Flannagan bills seem to be identical and all are similar to those introduced by the same members in the previous Congress, which went to the Ways and Means Committee, but on which the committee took no action.

•

Seven Promoted On Island Creek Staff

Seven key executives of the Island Creek Co. and two affiliated companies have been promoted in a rearrangement giving each company a separate general manager. Those promoted include the following:

C. E. Walker, former general superintendent, Pond Creek Pocahontas Co., promoted to general manager of that company.

John J. Foster, former assistant to Vice President R. E. Salvati, made general manager, Island Creek Coal Co.

W. A. Haslam, former general superintendent, Marianna Smokeless Fuel Co., elevated to general manager.

E. F. Clevenger, former auditor, Island Creek, appointed assistant to Vice President Salvati.

Franklin A. Rouse, former chief clerk to Mr. Clevenger, promoted to auditor of the Marianna company.

Floyd C. Honchell, former auditor, Marianna company, promoted to auditor of Island Creek.

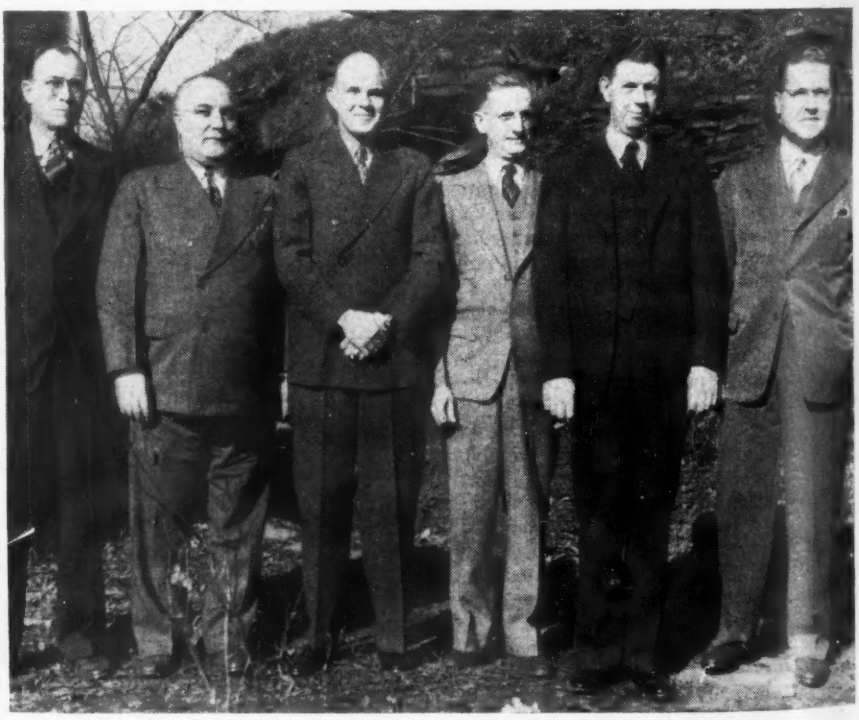
William H. Payne, former auditing clerk of the three companies, has been made chief clerk to the auditor of Island Creek.

•

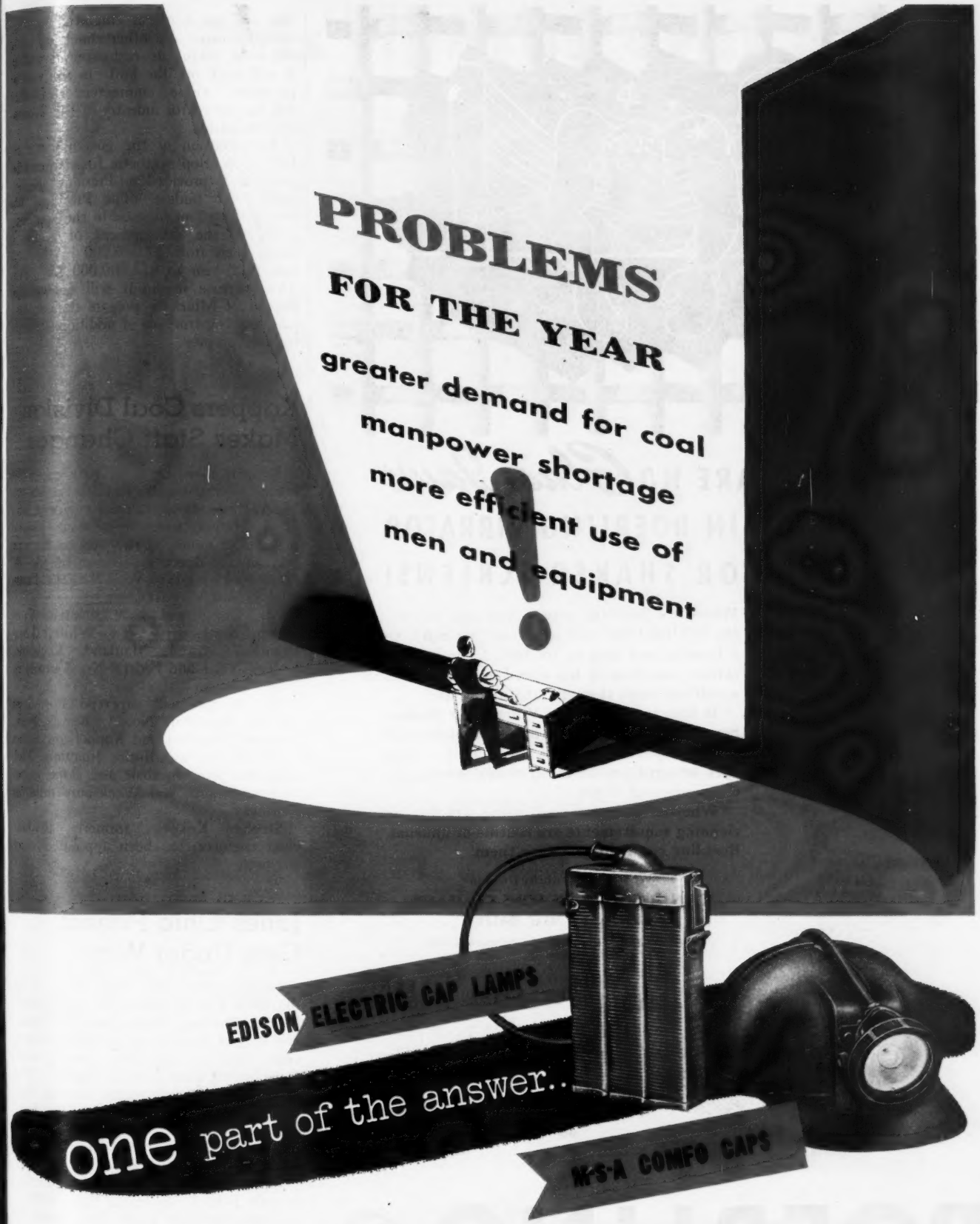
Work Starts on Plant For Synthetic Fuels

With two 10-hour shifts operating, work began Jan. 15 by the Hinman Brothers Construction Co. on building an access road and grading the site for the new liquid fuels research and development laboratory to be erected at Bruceton, Pa., by the U. S. Bureau of Mines. About 50 men are to be employed at the peak of the job, with grading for foundations to be ready for the first building Feb. 10 and for the second structure Feb. 20.

The laboratory (not to be confused with the demonstration pilot plants the Bureau is to build later to demonstrate methods of producing gasoline and other products from coal and oil shale) is part of a five-year research program in synthetic liquid fuels recently authorized by Congress. The laboratory, according to Secretary of the Interior Ickes, will be used to improve processes for hydrogena-



Island Creek executives promoted—Left to right: C. E. Walker, John J. Foster, W. A. Haslam, Franklin A. Rouse, E. F. Clevenger and Floyd C. Honchell.



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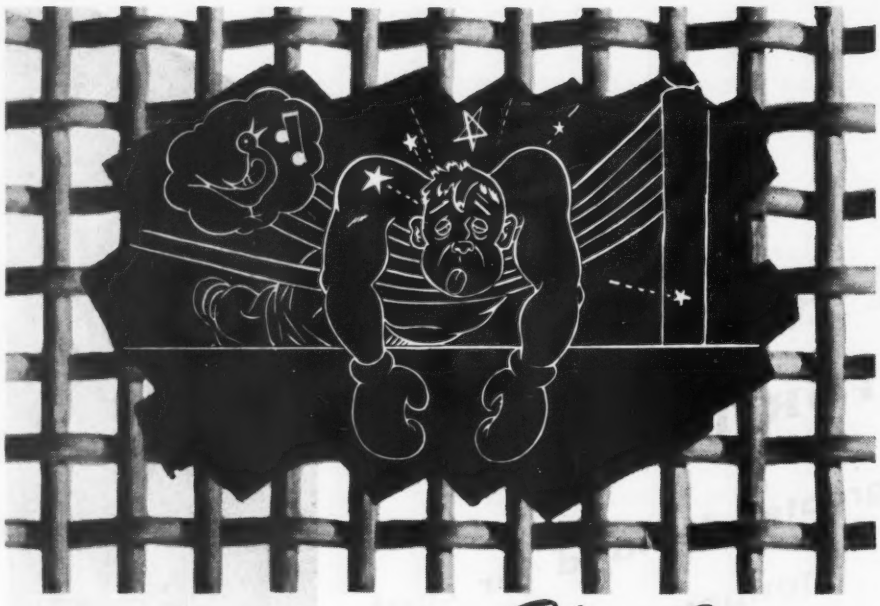
that spell **higher production** in mining

operations —— **MINE SAFETY APPLIANCES COMPANY**

BRADDOCK, THOMAS AND MEADE STREETS

PITTSBURGH 8, PENNSYLVANIA

District Representatives in Principal Cities



THERE ARE NO *Glass Jaws* IN ROEBLING VIBRATOR OR SHAKER SCREENS!

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When it's Roebling screen, you can be sure it's TOUGH! The kind of screen that can take a beating and stay on its feet... the kind of screen that runs at top speed and maintains a uniform mesh throughout its long life!

If this is the type of Vibrator or Shaker Screen *you* want, you can have it custom-built to *your* specifications in *any* metal... with wire screen from 325 mesh of .001" wire up to 6" openings of 1" rod.

Whether your filtering, sizing, grading or cleaning requirements are routine or unusual, Roebling can help you solve them.

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WIRE ROPE AND STRAND • FITTINGS • SLINGS • SUSPENSION BRIDGES AND CABLES
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tion and gas synthesis employed in England, Germany and other countries, using the most up-to-date techniques available. It will work out the kinks in the various processes, whose commercial feasibility will be proved for industry in the demonstration plants.

An extension of the government's efforts to develop synthetic fuels from coal products is provided in President Roosevelt's 1946 budget. The President has recommended an increase in the appropriation for the development of synthetic liquid fuels from $5,000,000 in the current fiscal year to $13,000,000 for 1946. This increase in funds will enable the Bureau of Mines to prepare designs and plan the construction of additional plants for this purpose.

•

Koppers Coal Division Makes Staff Changes

Koppers Coal Division, with executive offices in Pittsburgh, Pa., has promoted M. A. Evans, formerly chief engineer, and H. J. Harper, formerly assistant general manager of mines, to assistants to the vice president in direct supervision of the division's 19 mines in West Virginia, Pennsylvania and Kentucky.

Mr. Evans will have supervision of Helen, Stotesbury, Glen White, Long Branch, Carswell, Maitland, Keystone, Federal No. 1 and Federal No. 3 mines in West Virginia.

Mr. Harper will supervise Powellton No. 6, Powellton No. 3, Beards Fork, Midvale, Wharton and Kopperston mines in West Virginia; Butler Junction, Melcroft and Sonman shaft and slope mines in Pennsylvania, and Weeksbury mine in Kentucky.

Stephen Krikovic, formerly assistant chief engineer, has been appointed chief engineer.

•

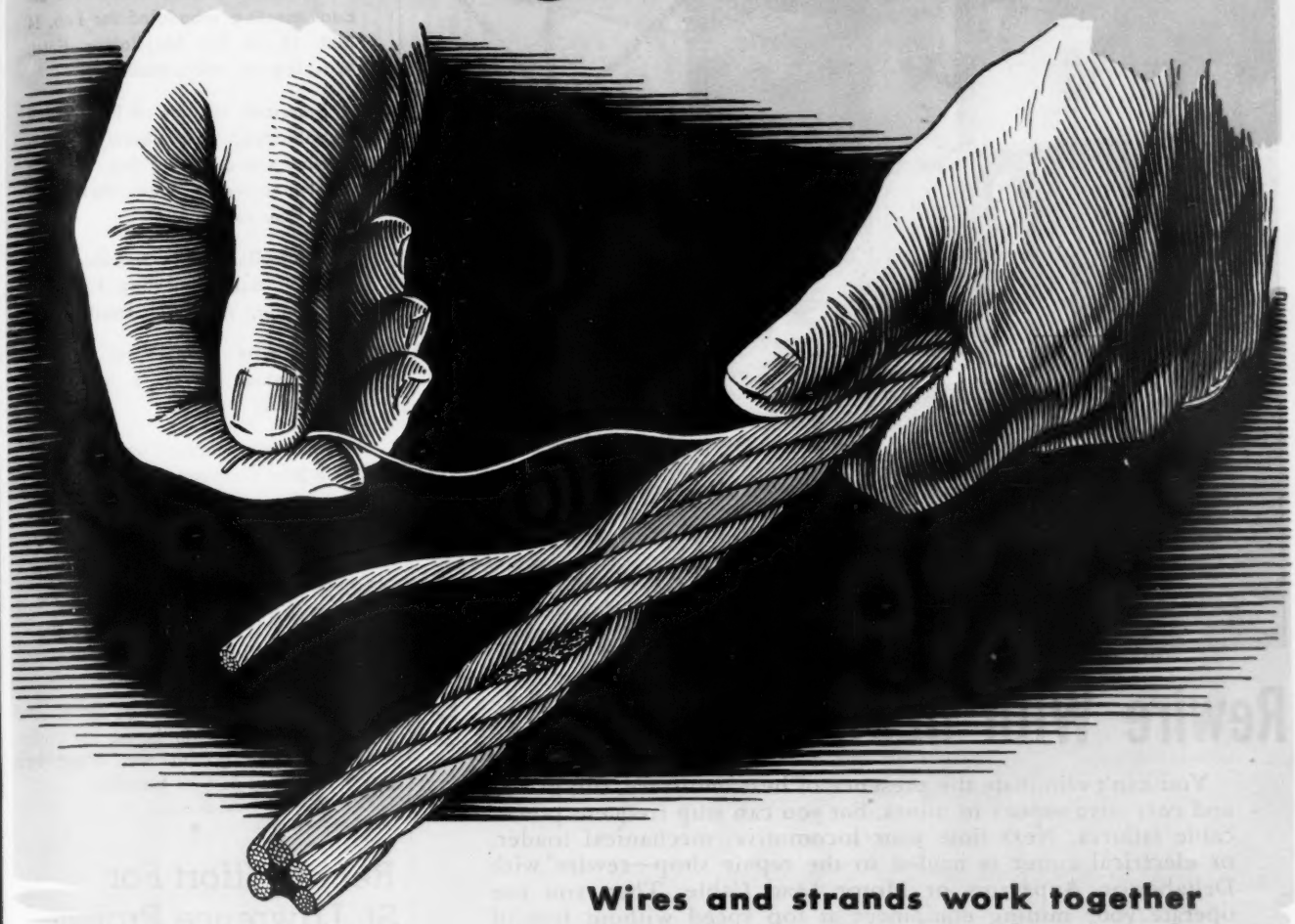
Jones Ohio Project Gets Under Way

Construction work began Dec. 21 on the latest Earl J. Jones coal development in the Hocking Valley-Roseville-Crooksville area of Perry County, Ohio, where a virgin field of high coal covering more than 14,000 acres is to be opened. The new operation will center in Ogg Run Valley, where 640 acres of land has been purchased.

Hiring of miners started late in December, with construction of four slopes scheduled to begin Jan. 2 and production to start Feb. 5. By using three shifts it was expected that 1,200 tons would be produced daily, with the tonnage increasing to reach 6,000 tons by March 1. The company had such equipment ready as belt lines, chain conveyors, fans, drills, generators, electric lights, and expected delivery of ten new Joy machines and twelve cutting machines by Feb. 1.

By the same time it was expected that construction would be completed by the Ohio Power Co. of a 69,000-volt line to serve the new operation. Included in

This fight is over



Wires and strands work together instead of against each other in *PREFORMED* YELLOW STRAND . . .

Don't get us wrong. The fight you *want* in *Preformed* Yellow Strand is there. It fights wear . . . delay . . . excessive wire rope costs.

But no one wants fight *inside* a rope—the wasteful stresses that result when springy wires and strands are twisted into place and kept there by force. Such straining parts are bound to lower the efficiency of an unpreformed rope.

This condition is corrected in the making of *Preformed* Yellow Strand. A patented process *preforms* each strand . . . sets both the strand and its wires to the curvature needed in the finished rope. The parts don't fight . . . they *fit,* as the illustration shows.

With internal conflict under control, a rope has little reason to stiffen, kink or squirm. So *Preformed* Yellow Strand is flexible and easy to manage. It is better prepared to withstand bending fatigue. It spools evenly . . . requires less breaking-in . . . increases safety . . . lasts longer.

Specify *Preformed* Yellow Strand by name. Get all you should in wire rope performance and economy. Broderick & Bascom Rope Co., St. Louis 15, Mo. *Branches:* New York, Chicago, Houston, Portland, Seattle. *Factories:* St. Louis, Seattle, Peoria.

HAND BOOK FREE: "Wire Rope for Mining" contains useful facts, tables, pictures. Write for your copy.

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Yellow Strand

PREFORMED WIRE ROPE

STOP FREQUENT POWER FAILURES

Rewire With DELTABESTON CABLE

You can't eliminate the presence of heat, moisture, oil, grease and corrosive vapors in mines, but you can stop frequent power cable failures. Next time your locomotive, mechanical loader, or electrical cutter is hauled to the repair shop—rewire with Deltabeston Apparatus or Motor Lead Cable. Then you can operate your mining equipment at top speed without fear of unexpected power failures.

Deltabeston Apparatus Cable is designed for wiring low-voltage apparatus in mines, collieries, steel mills and in other installations where severe operating conditions prevail. This *asbestos-insulated* cable has proved time and again that it can successfully resist excessive heat, high humidity, grease, oil and other destructive agents. Where ordinary power cable soon becomes unfit for service, Deltabeston performs at peak load with the utmost dependability.

For additional information write to Section Y251-10, Appliance and Merchandise Dept., General Electric Co., Bridgeport, Conn. Deltabeston Wires and Cables are distributed nationally by Graybar Electric Co., General Electric Supply Corp., and other G-E Distributors.

BUY WAR BONDS AND KEEP THEM

Here's how we construct Deltabeston Apparatus Cable to provide mining equipment with positive protection against power failures.

1. Very soft, small copper strands—for greater flexibility and to withstand vibration.

2. Heatproof felted asbestos—for protection against overload conductor heat.

3. Varnished cambric—for moisture resistance and high dielectric strength.

4. Felted asbestos—for extra protection against high ambient temperatures.

5. Asbestos braid—for high resistance to heat, moisture, oil, grease and most corrosive vapors.

GENERAL ELECTRIC

MEETINGS

- **American Mining Congress: annual meeting scheduled for Feb. 14 and 15 at the Mayflower Hotel, Washington, was cancelled.**
- **American Institute of Mining and Metallurgical Engineers: annual meeting scheduled for Feb. 18–22 at the Pennsylvania Hotel, New York City, was cancelled.**
- **Drumheller Coal Operators' Association: annual meeting, March 31, Drumheller, Alberta, Canada.**
- **Anthracite Conference: May 3 and 4, Lehigh University, South Bethlehem, Pa.**
- **American Mining Congress: Coal Mine War Conference, scheduled for the week of May 14 at Cincinnati, Ohio, has been cancelled.**
- **Big Sandy-Elkhorn Coal Operators' Association: annual meeting, June 3, Ashland, Ky.**

eleven new buildings to be constructed for use is a large wash house for miners, employment of whom was being built up to 1,000 as fast as possible.

•

Renew Effort For St. Lawrence Project

A new effort is to be launched to obtain congressional consent to the U. S. pact with Canada covering the St. Lawrence seaway and hydro power project, it was revealed on the opening day of the new Congress by Senator Aiken, leading senatorial proponent of the project. He announced that he intended to introduce a brief concurrent resolution on the proposal rather than the bill he sponsored in the preceding Congress. His reason for the switch, he conceded, was the hope of bypassing the Senate Commerce Committee, which, in his opinion, had shown hostility to the project. Senator Aiken anticipated that the concurrent resolution would be referred to the Foreign Relations Committee, as it was concerned with the narrow question of giving congressional assent to an international agreement.

It was reported on Jan. 6 that Senator Bailey would reintroduce the Omnibus Rivers and Harbors bill (H.R. 3961, 78th Congress) in the form that it was approved by the conferees except that he would eliminate the controversial Central Valley California water amendment. Judge Mansfield, chairman of the House Rivers and Harbors Committee, was expected to take similar action soon. No new projects are to be added by either Senator Bailey or Judge Mansfield, as it is hoped thus to obviate the necessity for further committee consideration of the measure.

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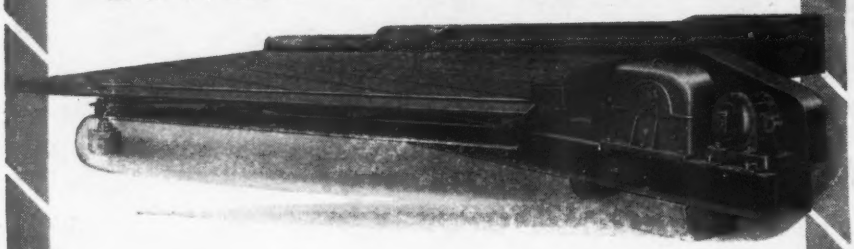
LOWEST OPERATING COST



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And there are many other features about SuperDuty Diagonal Deck Coal Washing Tables to make your business pay extra dividends in profits and freedom from operating worries. Write today for Bulletin No. 119.

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Pick Legislators To Present Cave Bill

With Willard Shortz as temporary chairman and Benjamin Evans serving as secretary, about 40 persons, including borough and city officials and private citizens from Luzerne and Lackawanna counties, assembled in Forty Fort (Pa.) Town Hall Jan. 7 to consider protection against mine caves. After a lengthy discussion Harold Flack, Republican State Representative from the Sixth District, and John E. Boney, Democratic legislator from the Fifth District, were designated to reintroduce the Kohler-Fowler Mine Cave Bill at the present session of the Legisiature.

A bill submitted at the last session, following a study of cave-ins by a three-man legislative commission, was resubmitted Jan. 23 by three senators. The measure, which died in committee of the last regular Assembly session, was sponsored by Edward J. Coleman (D., Lackawanna), John F. Cox (D., Allegheny) and George B. Stevenson (R., Clinton). It proposes that a three-member anthracite mine subsidence commission be set up to seek a solution of the cave-in problem. A $50,000 appropriation is proposed.

The proposed commission, set up within the State Department of Mines, would be directed to make studies of methods of preventing mine cave-ins and to cooperate with the Federal Government on a long-range program. The commissioners would be appointed by the Secretary of Mines with approval of the Governor. They would be paid $6,000 a year; $250 additional to the chairman. First appointments would be for two, four and six years, with subsequent ones for six years.

•

New Producers

The first car of coal has been shipped by the Blue Diamond Coal Co. from its new operations at Leatherwood, Ky., amid ceremonies attended by officials of the Louisville & Nashville R.R., whose line taps the field with a 10-mile spur through rough country. Good progress is being made on construction of the tipple at the $2,500,000 plant, which is to be the largest in the State, with a daily capacity of 100 cars when in full production. C. C. Youell, superintendent, said that a temporary chute would handle the tonnage produced until completion of the tipple.

DePuy Coal Co. has been organized at Whitesburg, Ky., to develop the Kings Creek-Line Fork cannel coal several miles from Whitesburg in Letcher County. It will be a truck operation, with Fred DePuy, Columbus, Ohio, president and C. F. Fishback, Columbus, vice president. J. W. Mabry, Logan, W. Va., who will be manager of operations, said about 3,000 acres will be developed, with loading scheduled to begin early in January.

Two of the mines are 6 miles from Roxana on the Louisville & Nashville R.R., where the coal is to be loaded. Other mines will be 8 miles from Roxana, while one mine will be over the mountain on Line Fork.

REDEDICATION

An Obligation to Our Fighting Men

DURING the last few weeks we have been forcibly reminded that so long as we still are fighting either of our major foes, first claim upon the productive resources of the United States—its manpower, materials, utilities, and industrial facilities—must be the production and delivery of munitions and war supplies. All other claims are secondary. No responsible citizen would have it otherwise. For in this war even more is at stake than our existence as a Nation. We dare not forget that we are engaged in a struggle that challenges the fundamental values upon which our civilization has been built.

It is not easy to list the values that we are fighting to uphold. They have been clothed in a variety of shapes over the centuries. They will assume new forms in the years ahead. But they have an inner consistency that free men the world over can feel and recognize: the right of the commoner against the noble, the right of the individual against the state, the right of trial by jury, the right to vote, the right to an education, the right to freedom of speech and worship, the right to work in a sphere of one's own choosing, the dignity and the equality of the individual under the law—these are our cultural heritage, painfully won and often precariously held over the ages, always to be rewon, redefined and buttressed by each succeeding generation of men.

The preservation of this vital core of value, and its transmission to our sons and daughters depends upon our victory in this struggle. So those things which are essential to victory must come first. And since the production of war munitions in overwhelming volume and quality can hasten that victory and save countless lives of our fighting men, no effort that will contribute to this end should be regarded by us as a sacrifice.

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The present is no time for self-congratulation upon our achievements either in the theatres of battle or of production. The mounting casualty lists should suffice to curdle the savor of any such indulgence. The most that can be said in reasonable taste and good conscience is that performance in both fields is such as to warrant our firm confidence that we can carry to successful completion the tasks that remain to be done.

Nor is there profit in even observing, much less deploring, that the tasks ahead are more formidable than those which were defined for us a few short months ago. Then, all of us—military leaders, government officials, workers, and business men—were riding a crest of optimism as to an early end of the war in Europe and as to the character and dimension of the war against Japan. Already we had begun to turn anxiously toward the problems of reconversion which then seemed so near at hand. Schedules for war production, based upon the best available estimates of need, called for a 5 billion dollar reduction from 1944 performance, even though we might have to continue a two-theatre war, and for a 40 percent reduction in the event of an early victory in Europe.

Today, those forward estimates have been revised sharply upward. That is true both of the 1945 requirements to meet the needs of a two-theatre war, and of requirements for the Pacific war once the European phase is ended. For this upward revision four chief reasons are responsible:

1. European battle experience has shown markedly greater use of expendable munitions than was provided in the formulae upon which our original production schedules were calculated: the result has been a depletion of inventories on a scale that would become dangerous if allowed to continue.
2. Experience has also demonstrated the need for new types of weapons or increased complements of some existing types to match new enemy equipment or tactics.
3. A less easy optimism as to the early ending of the European war has given rise to a growing disinclination to gamble on the approximate date.
4. An increasing conviction prevails that the war against Japan may require ground-army operations on the Asiatic mainland on a scale greater than originally premised.

But if these changes in the fortunes and outlook of war have raised our estimates of military requirements, may not subsequent favorable changes in the military situation cause them again to be revised downward? It is entirely possible. But our military men have learned that they cannot safely discount what *might desirably happen* as something that *will happen*. Those working on the production front also must learn that lesson. Fortunately, the record shows that we have been able to maintain a war production almost equal to that of the rest of the world combined, even while we produced for civilian use on a scale that has been large even by our

own pre-war standards. So we have ample margin to whip whatever war job may be required of us. As now defined, the task will not be easy. But it *can* and *will* be done.

☆ ☆ ☆

What, then, is the production task with which we are charged? Our 1945 production for the two-theatre war now calls for the substantial maintenance of the over-all levels reached in the latter months of 1944. But there is a shift of emphasis. Almost half of the programs for specific equipment items are declining. A few are scheduled to hold level. About 45 percent are scheduled to rise sharply. That means that workers and facilities must be shifted to man the expanding programs. At the same time the armed services are calling for many more men than can be supplied from those who become newly eligible to the 18 year old age group. That means further drafts upon war workers. It means also replacements for them when they are taken from the expanding programs. Finally, events demand that we produce as much as possible of many items during the first half of 1945.

Our task, then, is one of intensified effort for the immediate future, with multiple readjustments at a stage when adjustments are hard to make. Materials for which demand was easing as pipe-lines were being drained in anticipation of falling schedules again are tight as the pipe-lines are being refilled to meet augmented requirements. Men, women, and facilities must be shifted from less essential to more essential tasks. What must be done will be done. But unless there is much voluntary accommodation, it will be necessary for us to suffer a formidable amount of governmental direction which none of us likes, many of us deeply resent, and all of us, when personally affected, volubly protest. The more we police ourselves, the less we shall be policed.

☆ ☆ ☆

Even after Germany has been defeated, we shall still face a far from light production requirement to continue the war against Japan. As currently defined this phase might require war expenditures at something like $70 billions a year, an over-all reduction of approximately 20 percent from the $89 billions spent in 1944. Reduction in munitions output would be somewhat greater, probably from 25 percent to 30 percent below 1944 levels. But it is important for us to acknowledge that the reduction is going to be substantially less than the 40 percent previously estimated.

Only a few months ago there were those who questioned sharply the possibility that we might need 60 percent of current munitions output to win the Japanese war. Now the judgment of the military is that 70 percent will be none too high.

Actually the latter level would represent an increase of little more than 50 percent above what now is being produced for the Pacific area. This, certainly, is a modest estimate when we reflect that we shall inevitably more than triple the Army forces assigned to that theatre.

Such a program probably would give us a current mu- nitions supply from three to four times that produced b Japan, but it is believed that we shall need that muc to compensate for the advantages derived by Japan fro the fact that she will be fighting a defensive war, fro the volume of her accumulated stores, from her pre- pared positions, her shorter lines of supply and trans- port, and from her large troop reserves, the bulk which we have yet to meet in battle. Certainly our pres ent 3 to 1 production edge over Germany does not ap- pear to be excessive.

The more modest V-E Day cuts contemplated by th present plan will mean a less acute reconversion prob- lem when they are made, but will leave a greater on to be met at the end of the war. They will mean prob- ably a net increase of not more than 4 million worker available for civilian work during the transition period Their orderly absorption should present no embarrass- ing problem. Indeed, we now are warned by Washingto that war production following V-E Day may requir the protection of considerably closer control than wa contemplated under the 40 percent cuts previously expected.

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In short, we face for the immediate future a mor difficult production job. It is made the more formidable by the fact that we had dulled the keen edge of ou will to produce by our premature expectation of a re- duction in requirements. Now we are told that the trend of war production for the immediate future is up, tha it is unsafe to discount the date of victory in Europe and that the amount of leeway for reconversion after the defeat of Germany is less than had been anticipated.

Accordingly, we must rededicate ourselves to the task of driving war production up. We must do without some of the things that we have enjoyed on the civilian front rather than demand more of those things; we have still to devote our abilities and energies first and foremost to the demands of war.

Whatever will assure and hasten victory must have first place in any statement of American policy.

Without victory, our aims, and the underlying values upon which they are based, will be extinguished, blotted out by the opposing aims and values proclaimed by our enemies.

The needs of our fighting men must be put first. For, unless we win the war, the National aims and policies of the United States will cease to have meaning in the world.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Co., Inc.

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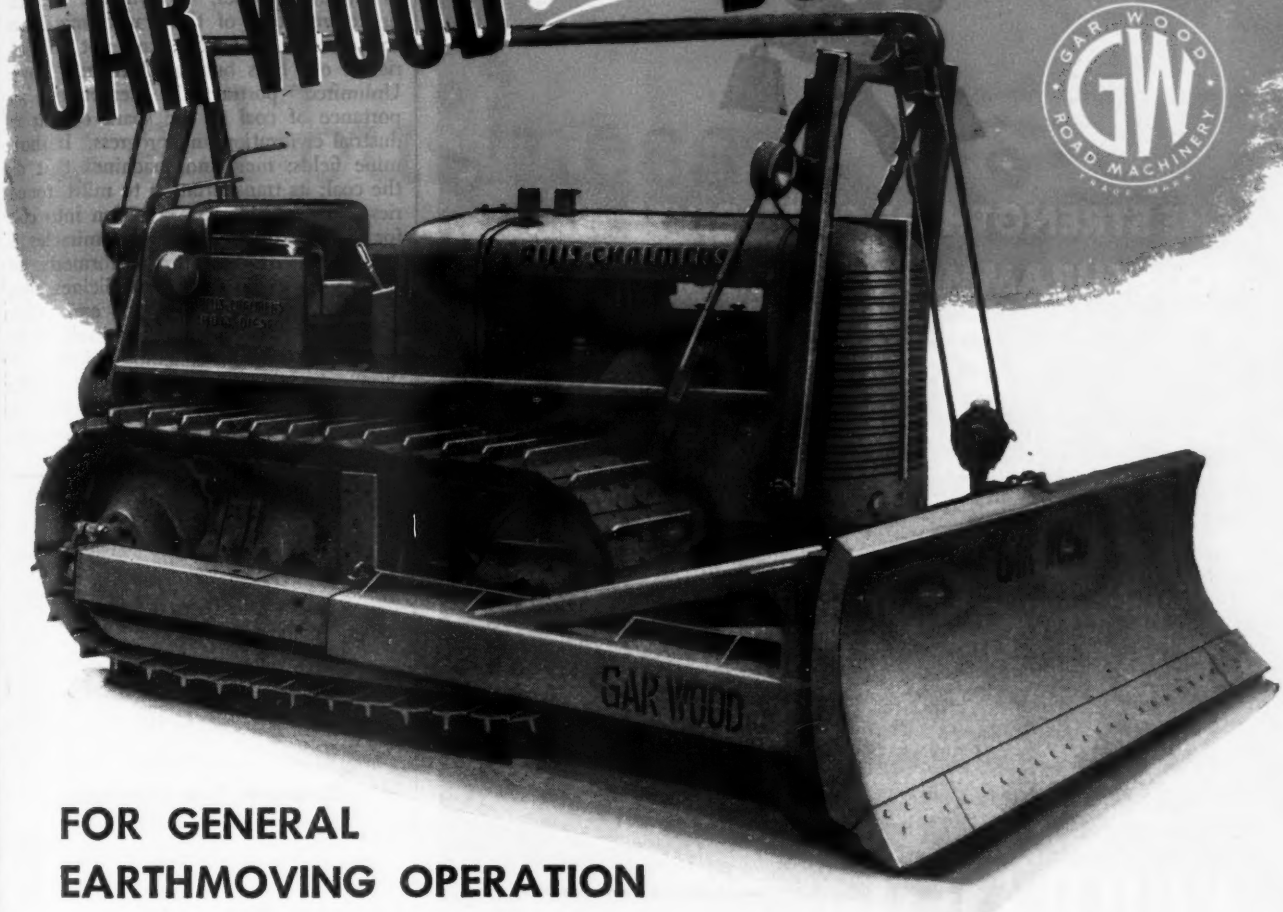

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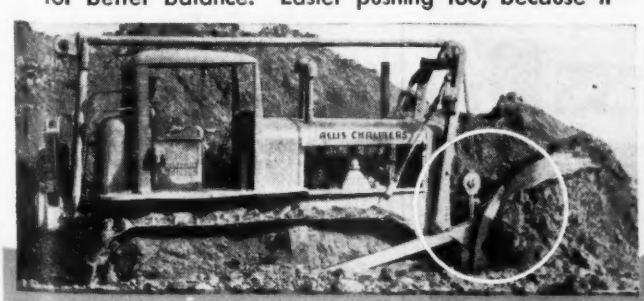
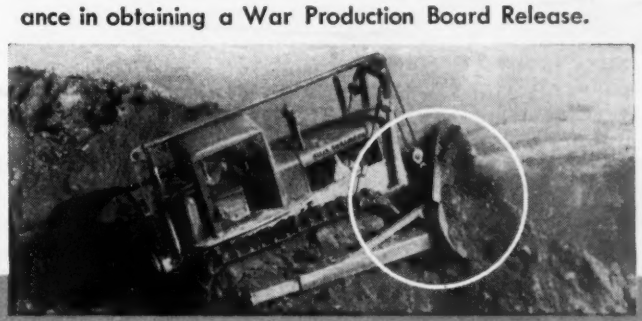
A newcomer to the civilian field . . . thoroughly tested by months and months of strenuous military service. Designed by Gar Wood engineers and found to meet all Army and Navy requirements, this rugged Dozecaster embodies new and improved engineering developments that give you more efficient performance. Note the moldboard *built closer to the radiator* for better balance. Easier pushing too, because it actually *rolls the dirt ahead of it.* (See picture below) Moldboard can be angled to either side and tilted. Comes with the famous Gar Wood CABLE CONTROL UNIT, either single or double drum. Now available in limited quantities for essential civilian use. Consult your nearest Allis-Chalmers dealer for assistance in obtaining a War Production Board Release.





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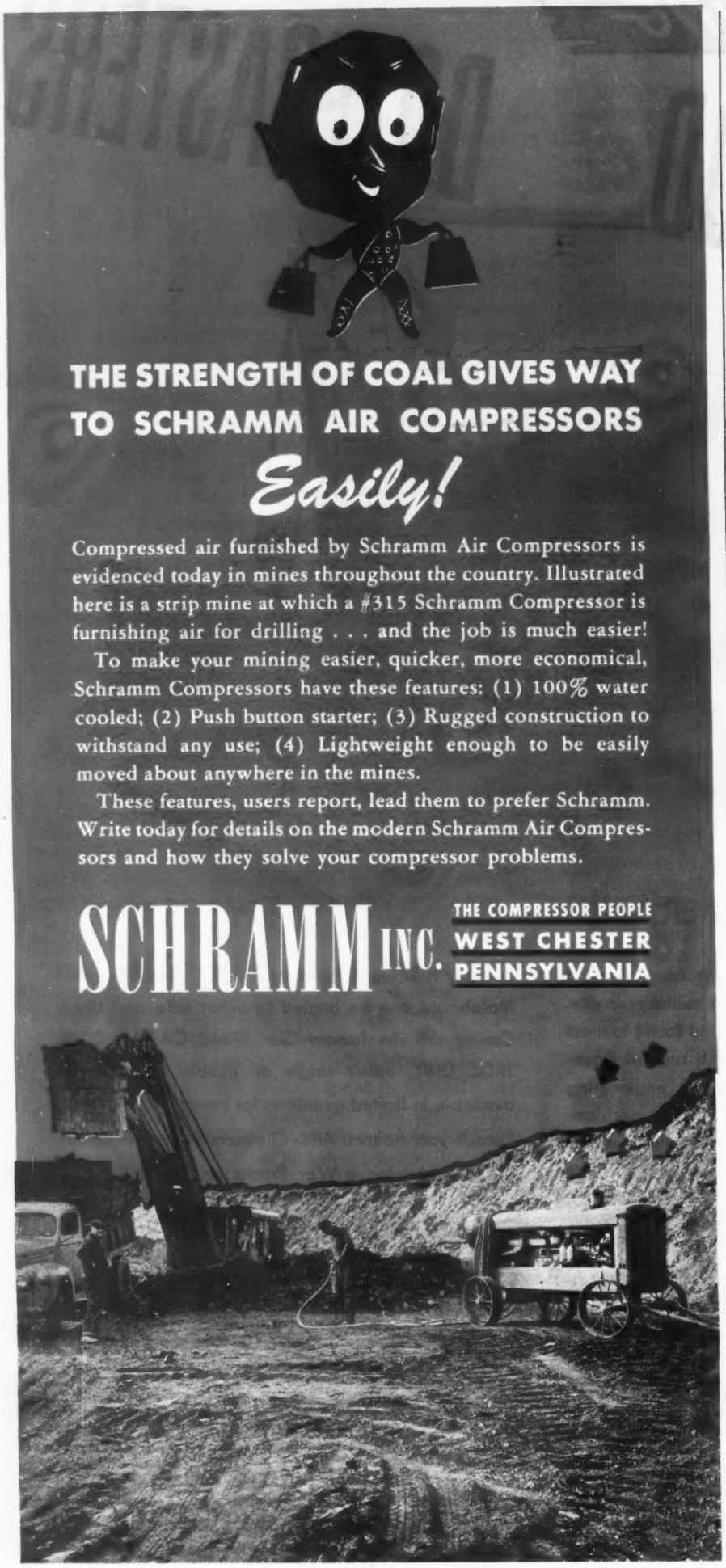
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To make your mining easier, quicker, more economical, Schramm Compressors have these features: (1) 100% water cooled; (2) Push button starter; (3) Rugged construction to withstand any use; (4) Lightweight enough to be easily moved about anywhere in the mines.
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Human Side of Coal Shown in Film

With the cooperation of the Bituminous Coal Institute, a short feature film has been produced showing the human side of coal. The film is R.K.O.'s "Power Unlimited" in Frederic Ullman Jr.'s "This Is America" series. A dynamic and enlightening story of the transformation of coal into products that have not only enriched our lives but saved them, "Power Unlimited" portrays the tremendous importance of coal as the spark of our industrial civilization and progress. It shows mine fields; men and machines that dig the coal; its transportation to mills, foundries and factories; its conversion into coke for iron and steel, and the miracles of chemistry that convert the formerly dissipated smoke into drugs, medicines, dyes, cosmetics, perfumes, plastics and nylon.

The film does not confine itself to the mechanics of mining and industry. It shows the manner of man who devotes his entire life to the mining of coal. It shows where and how the miners and

COAL ACTIVITY

Bituminous Coal Stocks

	Thousands Net Tons Dec. 1 1944	P.c. Change From Nov. 1 1944	P.c. Change From Dec. 1 1943
Electric power utilities	17,671	−1.6	+10.4
Byproduct coke ovens	6,737	+5.3	+15.8
Steel and rolling mills	783	−1.6	+11.4
Railroads (Class I)	14,423	−1.8	+39.6
Other industrials*	18,712	−3.6	−15.7
Total	58,326	−1.6	+ 6.2

Bituminous Coal Consumption

	Thousands Net Tons Nov. 1944	P.c. Change From Oct. 1944	P.c. Change From Nov. 1943
Electric power utilities	6,831	+1.1	−0.05
Byproduct coke ovens	7,748	−3.0	+0.6
Steel and rolling mills	908	+4.7	−0.6
Railroads (Class I)	10,715	−2.1	−3.3
Other industrials*	13,351	+7.2	−3.3
Total	39,653	+1.7	−1.1

* Includes beehive coke ovens, manufactured-gas plants and cement mills.

Bituminous Production

December, 1944, net tons	44,735,000
P.c. change from December, 1943	−17.5
January-December, 1944, net tons	620,000,000
P.c. change from Jan.-Dec., 1943	+5.1

Anthracite Production

December, 1944, net tons	4,570,000
P.c. change from Dec., 1943	−8.5
January-December, 1944, net tons	64,445,000
P.c. change from Jan.-Dec., 1943	+6.2

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Burners
November, 1944	4,612	3,683
P.c. change from Nov., 1943	+80.3	+83.6
January-November, 1944	33,727	29,057
P.c. change from Jan.-Nov., 1943	+34.6	+83.9

Index of Business Activity*

Week ended Jan. 20	230.5
Month earlier	231.4
Year earlier	239.8

**Business Week*, Jan. 27.

Electric Power Output†

Week ended Jan. 20, kw.-hr.	4,576,713,000
P.c. change from month earlier	+8.3
P.c. change from year earlier	+1.0

† Edison Electric Institute.

To all business, large or small...

Postwar business competition is going to be tough. Whether your trucks *make or lose money* for you is going to be more important than ever before.

Today in wartime, the lack of new civilian trucks has thrown a revealing light on the performance and stamina of every make of truck in the United States. Right now is the time to dig into all the facts as they exist—to find out which trucks are standing up best under the toughest conditions trucks have ever had to face.

Now is the time to determine which trucks will do YOUR job in the BEST possible way, at the LOWEST COST during the years ahead.

The phrase "Built like a Mack truck" got into the language because of something real that is *built* into Mack trucks.

Step by step—in materials, design and workmanship—they are deliberately built to work harder—last longer—require less repair than any other truck you can buy.

This is not a "claim," but a fact! It is backed by the records of thousands of wartime Mack owners who have seen Mack's better construction pay off at a time when it was needed most.

They will tell you—in no uncertain terms—that the man who owns a Mack is lucky, and the man who plans to get one is wise.

Essential civilian users can now secure Mack trucks. Ask your nearest Mack branch or dealer for details.

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TRUCKS

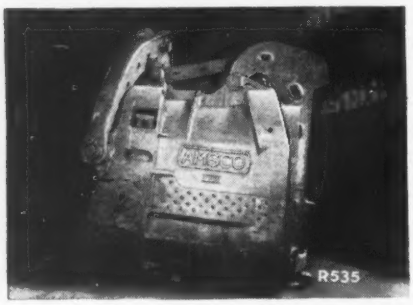
ONE TON TO FORTY-FIVE TONS; BUSES FIRE APPARATUS AND MARINE ENGINES

PERFORMANCE COUNTS

Buy That Extra War Bond Today

Sound Dipper Design and *"The Toughest Steel Known"* Work Together

Whatever combination of soil, clay, shale or rock comprises your overburden, you will want to investigate the advantages of Amsco renewable lip dippers, designed for fast, full loading, rapid, clean dumping, and exceptionally long life.



R-535—A 15 yd. renewable lip dipper built for use in an Indiana mine.

The properties of manganese steel "the toughest steel known" make it particularly adaptable to the varying conditions found in strip mining. A dipper's wearing surfaces become hard and smooth under impact and pressure, enabling it to withstand drastic abrasion while retaining its toughness to absorb pulling, torsional and shock stresses. Coal loading conditions are also severe enough to require manganese steel so Amsco renewable lip dippers are ideal for this service, as well as for stripping. Some operators use the same dipper for both operations.

This patented renewable lip dipper is the end result of more than three decades of improvement. The lip is securely locked to the dipper by U-bolt fastenings and interlocking joints, but can be removed easily and quickly right on the job. No expensive burning off of old rivets or welds is necessary.

Both interior and exterior surfaces are free of obstructions and facilitate digging and loading. The free swinging door and the outward tapers from lip to door of the bucket allow fast, positive dumping.

Send for Bulletin 743-M which shows Amsco renewable lip dippers of all sizes up to 18 yard capacity made for all sorts and conditions of strip mining.

A-467—Three Lorain shovels equipped with 3/4 yard Amsco renewable lip dippers on a Pennsylvania operation are shown loading and stripping.

Amsco Conservation Welding Materials fight wear and restore worn dippers. Send for Bulletin 941-W.

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their families live and the effort of the operators to make their living comfortable in the company towns. It shows the large operations and the small.

•

Overseas Coal Picture Still Difficult

A British mission of coal men that recently concluded a tour of stripping operations in the United States reported Jan. 8 in London that machinery being sent from America to aid Britain's faltering output was old and far inferior to that in use in the United States, says a dispatch to the New York *Times*. This and lack of spare parts for existing British coal-mining machinery and for imported machines, said the mission, posed difficulties in maintaining British production on an increasing scale in 1945. The mission stressed American maintenance as enabling machinery to work continuously seven days a week on three shifts.

As a result of visiting 72 U. S. stripping operations and ten plants making excavators the British observers recommended that the American system of "salvage" production, in which a contractor mines the coal and delivers it at a certain price a ton, be seriously considered by the British Government and producers. Stripping in Britain, begun only after the start of the war, is producing at the rate of 12,000,000 tons a year and has been mounting steadily while the output of British deep mines has been diminishing.

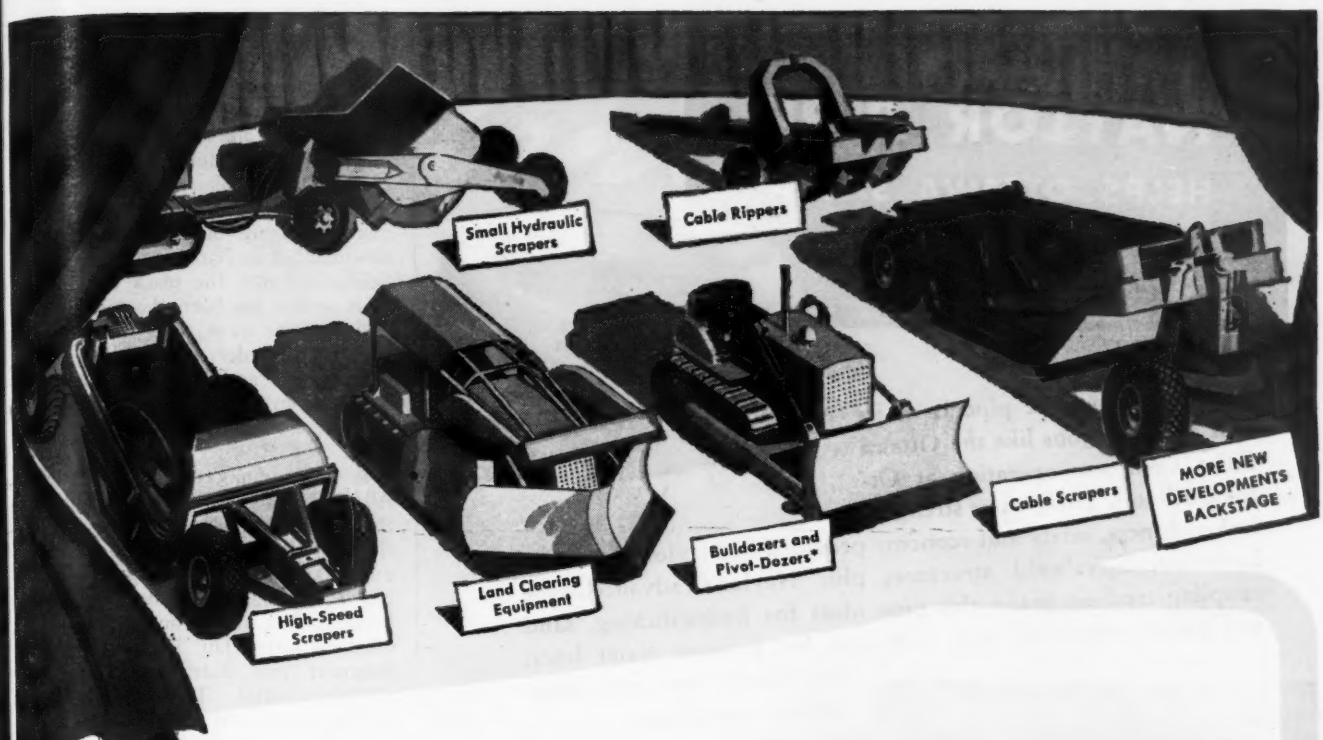
Replying publicly to the above charges, the British Ministry of Works said that while the equipment is largely second-hand it is still greatly superior to anything available in Britain. Some new equipment was sent, it was said, but it could be ill spared and was given to Britain at considerable sacrifice by civil and army suppliers, and the Ministry said it was very glad to get it.

Compulsory integration of the British industry under a central coal board representing its present private owners was recommended Jan. 22 by Robert Foot, chairman of the Mining Association. The board would treat the whole industry as one family consisting of normally independent and self-supporting members but be authorized to finance any mine either for capital or revenue purposes.

To nationalize the industry, as the miners' unions advocate, he declared, would be to adopt "a policy of despair." Nationalization of the mines had long been a political ambition of the Labor party, he said, but to make this a political decision would be a great national mistake.

The reorganization, he stated, would promote close contact and consultation with the government on all matters affecting national policy. The plan would require more faithful work from the miners than of late, and from the managers, enterprise and modern efficiency.

Theft and dishonesty were blamed by Maj. Gen. G. W. E. Y. Erskine at Brussels Jan. 10 for bringing on Belgium a coal shortage so serious that a few days of frost on the canals or drifting snow on the roads would result in severe hardship



LaPLANT-CHOATE'S

1945 MODEL REVIEW

For the Benefit of Essential Users Who Want to Know What New Equipment Will Be Available This Year

Despite the continued heavy *military* demand for LaPlant-Choate equipment, there is a possibility that increasing quantities of certain models will be available this year to *civilian* users with WPB approval. Therefore, in order to give you as much assistance as possible in planning your 1945 equipment needs, we are presenting a review of current LaPlant-Choate models scheduled for production early in '45.

Naturally space won't permit showing you "the complete cast" here because LaPlant-Choate is building over 30 different models of earthmoving and land clearing equipment—both cable and hydraulic operated—for use with all sizes of "*Caterpillar*" track-type and high-speed, rubber-tired tractors. However, your *La-Plant-Choate* "*Caterpillar*" distributor, who has been selling and servicing dependable LaPlant-Choate equipment for over 20 years, will gladly give you full information. See him today! LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

*Trade-Mark applied for

LaPLANT-CHOATE

Earthmoving and Land Clearing Equipment

NAYLOR PIPE
HELPS OTTAWA SILICA MOVE MOUNTAINS

Naylor light-weight pipe is at its best on tough jobs like the Ottawa Silica Company operation at Ottawa, Illinois. The greater strength, leak-tightness, safety and economy provided by Naylor's exclusive Lockseam Spiralweld structure, plus Naylor's advanced-type coupling medium make this pipe ideal for hydraulicking, sand and gravel conveying lines, high and low pressure water lines, ventilating lines and other similar operations.

Sizes from 4" to 30" in diameter. Thickness from 14 to 8 gauge. All types of fittings, connections and fabrication.

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General Offices: 1248 E. 92nd STREET, CHICAGO 19, ILL.

New York Office: 350 Madison Avenue, New York 17, New York

for civilians and interfere with the Allied armies. As it is, he said, the British forces are obliged to get along on one-quarter of their normal allotment. Belgians without any coal are estimated at as high at 5,000,000. According to General Erskine, coal is being stolen from military trains in transit by gangs of as many as 150 men, yards are being raided and orders allocated for civilian use are systematically sidetracked into the black market. Even more serious has been the misdirection of coal by mine owners and industrialists in violation of orders issued by the Belgian Government and Allied military authorities. Seven Belgian mines, it was said, have been diverting 1,000 tons of coal daily.

It was announced two days later that Allied military authorities would inform the Belgian Mininstry of Economic Affairs that all its orders relating to the coal industry would have to be approved by Supreme Headquarters, Allied Expeditionary Force, before they would be valid. The Ministry agreed Jan. 17 and consequently transport and distribution went under military control. The existence of two governments—that of Prime Minister Hubert Pierlot, on the one hand, and that of General Erskine, head of the SHAEF mission to Belgium—is blamed for the difficulty by the Belgians and certain officers charged with responsibility.

A coal shortage in Spain was reported Jan. 14 to have forced the cancellation of many trains and left tens of thousands of residents shivering in apartment buildings whose owners were unable to obtain coal.

•

Extend Overfire Jets To Minimize Smoke

Continuing its efforts for smoke elimination through use of staggered steam-air jets over fireboxes of locomotives, the Louisville & Nashville R. R. reports it has been granted authority to equip its engines thus at Nashville (24), Louisville (18), Cincinnati (31), Atlanta (6), and Birmingham (20). These are in addition to 38 already so equipped and six diesel switchers at Nashville and 22 at Louisville.

•

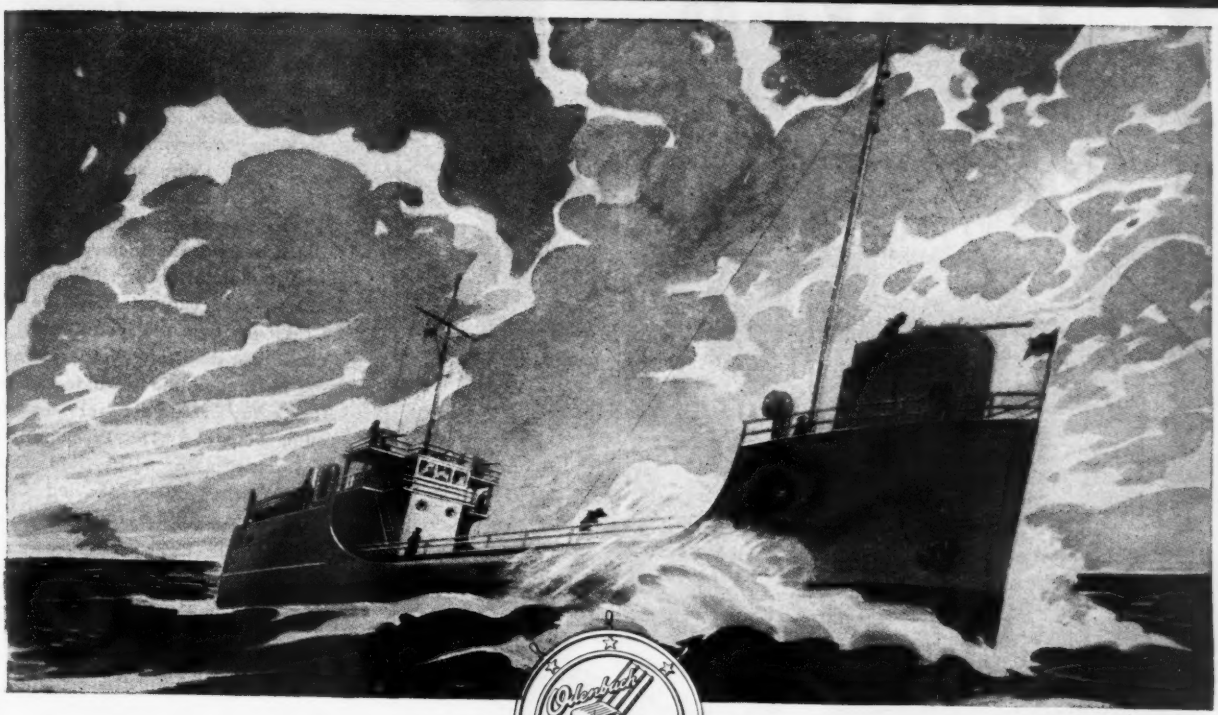
Personal Notes

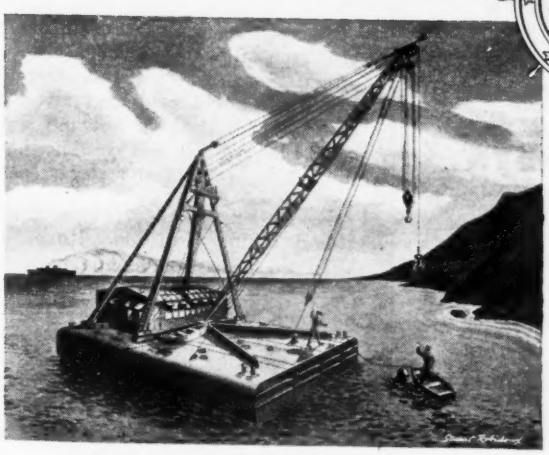
ORVILLE R. LYONS has been appointed preparation engineer at the Northern coal mines of the Republic Steel Corp. He is a graduate of the University of North Dakota in mining engineering and geology and received a master's degree in mining engineering at the University of Alabama in 1940. He went to Republic from the Battelle Memorial Institute, Columbus, Ohio, and will reside in Clarksville, Pa.

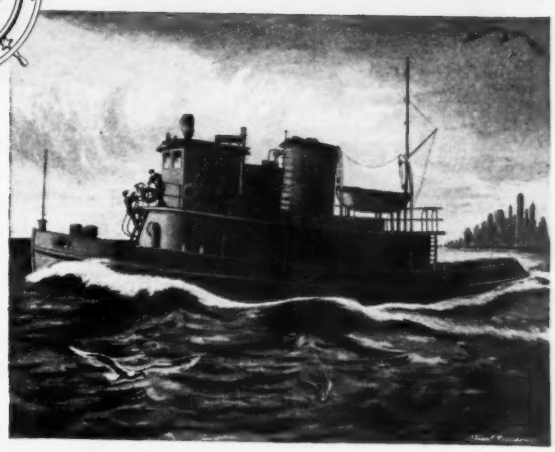
EWELL J. LYTTON, regional bituminous coal manager, Bluefield, W. Va., has resigned and been elected treasurer of the Utilities Elkhorn Coal Co., Pikeville, Ky. He has been identified with the coal industry for 25 years.

FRED G. KOPER, former associate of the late Charles E. Stuart, has opened an

Odenbach







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WAR TIME BUILDERS of U. S. Army Tankers, Derrick Barges, Utility Barges, Floating Cranes, Tugs serving the United Nations throughout the world.

PEACE TIME BUILDERS of ocean-going Tankers, Derrick Barges (knock-down type) Lake and Coastwise Freighters, Tugs, Trawlers, Barges for Inland Waterways.

Write for our Booklet on Designs, Shipbuilding, Conversions and Repairing

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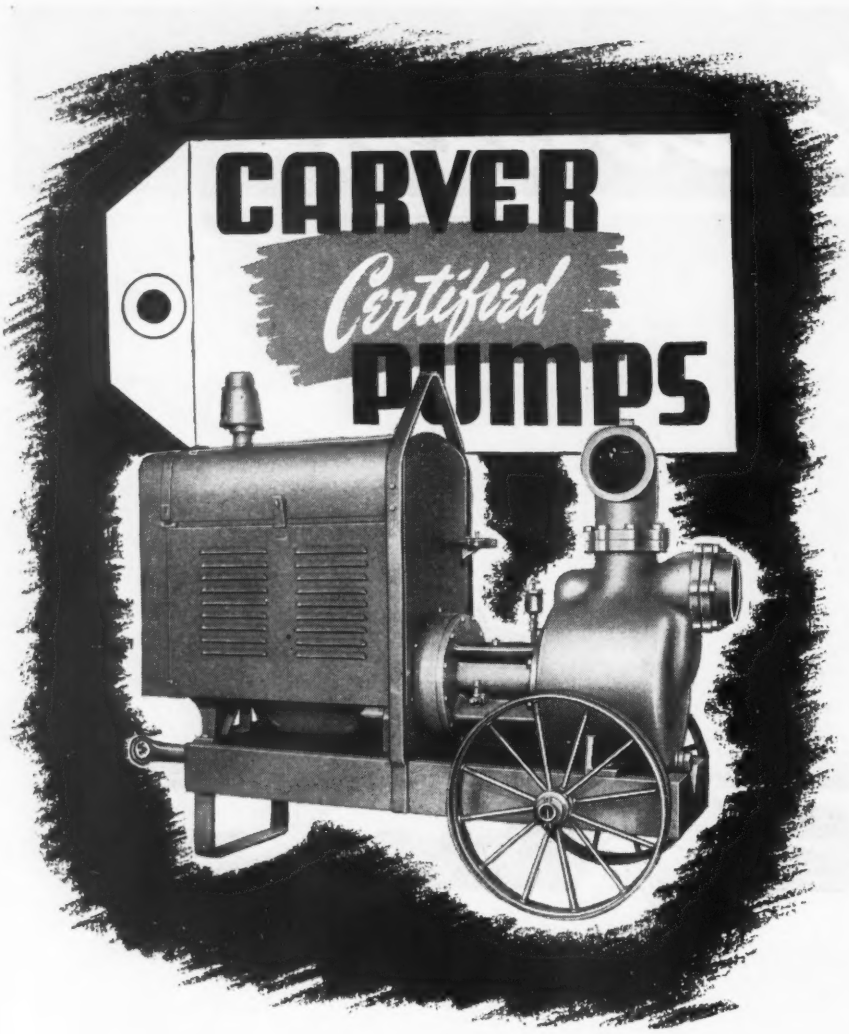

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You can pump more water at less cost per gallon with a Carver Pump because it stays on the job longer at top performance. Trouble-proof design, lifetime, tungsten carbide seal, special, long-life impeller and removable liner mean less time out for repairs and maintenance. The recirculation tube is scientifically designed to provide fastest priming, peak efficiency, and correct amount of recirculation to keep priming chamber free from clogging deposits of silt, sand or dirt.

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THE CARVER PUMP CO.
Muscatine, Iowa

CARVER CENTRIFUGAL PUMPS

RED CROSS WAR FUND

Even after the last gun has been fired many a month will pass before all our fighting men are home. Some will be confined in hospitals for long periods of recovery. Traditional Red Cross service for these men who have sacrificed so much will continue unabated. No less sacred is the obligation to stand by with all necessary aid while veterans of this war, now being returned to civil life, adjust themselves to new conditions, prepare to take their rightful place in field and factory. Essential and humanitarian services which at home have characterized the Red Cross through the years must be continued: disaster relief, home nursing instruction, nurse's aide training, the many volunteer services and other activities. The President has designated March as Red Cross month, when the 1945 Red Cross War Fund will be raised. We all must do our part.

office at 120 Wall St., New York City, in association with A. R. Burnette, power-plant-design and industrial engineer. As a member of the engineering firm of Stuart, James & Cooke, Mr. Koper had charge of that firm's coal-plant design and coal preparation work, which also covered an extensive part in the development of the Russian coal fields and investigations of coal preparation in Belgium, England and Germany. He will continue his work in coal-plant design and coal preparation.

R. R. KNILL, safety engineer for the Union Pacific Coal Co., Rock Springs, Wyo., has resigned. Joining the company in 1924, he was in the engineering department for two years; acted as resident engineer at Superior for one year; served as assistant director of mechanical loading for two years; was mechanical loading foreman in Rock Springs No. 8 mine for six months; then acting ventilation engineer for four months; ventilation engineer, 1930-37, when he became safety engineer.

EARL SHAGLEY, secretary-treasurer of Walter Bledsoe & Co., Terre Haute, Ind., for more than 30 years, has retired and been succeeded by F. W. Beushausen. The latter has been district manager of the company's Cincinnati office since 1939 and an employee of the organization since 1926.

JAMES D. IRELAND, former superintendent, Crow Hollow division, Hanna Coal Co., has become operating vice president of the organization owning and controlling the Cameo Coal Mining Co. and the Lando Coal Corp. He also is a member of the management committee, with headquarters at Cameo, W. Va. Cameo operates in Boone County and Lando in Mingo County, West Virginia.

THOMAS G. VALLEAU, formerly with

Announcement

Cletrac joins OLIVER

The acquisition of "Cletrac" by The OLIVER Corporation proves the importance with which the corporation views the manufacturing and marketing of tractors for industrial and construction needs. To meet the requirements of these users, an Industrial Division of the corporation has been established.

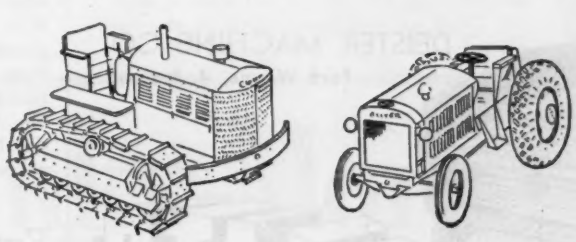
The Industrial Division of The OLIVER Corporation will have its headquarters at 19300 Euclid Avenue, Cleveland 17, Ohio. In addition to the well known "Cletrac" line of track-type tractors and allied equipment, the Industrial Division will also have in its charge, sales and service of industrial tractors of the wheel type now in development as well as other industrial products long manufactured by The OLIVER Corporation.

"Cletrac" Tractors for agricultural service will be handled by the Agricultural Division of The OLIVER Corporation, 400 West Madison Street, Chicago 6, Illinois.

Bringing to "Cletrac's" already ample research, engineering, manufacturing and service the corresponding facilities of The OLIVER Corporation, means that a complete line of even better "Cletracs" will be manufactured in the future and that service to "Cletrac" owners will be enhanced.

The dealers who sell OLIVER "Cletrac" Tractors are now in a position to serve you more completely than ever. The OLIVER Corporation, 400 West Madison Street, Chicago 6, Illinois.

The OLIVER Corporation



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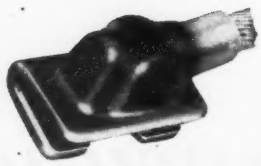
We invite you to make Mosebach your headquarters for complete RAIL BOND service. Mescoweld bonds are available in 18 styles to meet every bonding need, all manufactured by the patented Flashweld* method and providing uniform low resistance.

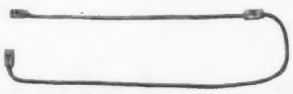
Our record of more than 20 years service to the mining industry is your assurance of time-tested equipment. Write for Catalog No. 44 or phone HEmlock 8332 for your copy.

* * *

*This process provides an absolute connection between the end of each individual wire in the Stranded Copper Cable and the forged steel terminal. It prevents oxidation of the copper wire at welded intersection.

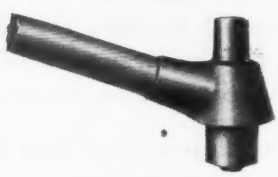


Type M8-F



Type M8X-F

M5-F Terminal



M16-F Wedge Type

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Rugged IS THE WORD For PLAT-O SCREENS

Take a good look at a Plat-O Vibrating Screen and you can readily see why more and more operators are specifying Plat-O to handle their toughest coal grading jobs.

At every point in design and construction, the emphasis has been placed on simplicity and strength to assure dependable, low-cost performance . . . hour after hour, day after day.

For your toughest screening operations, there's a sturdy, rugged Plat-O Vibrating Screen that will give you more accurate grading and more profitable performance. Choose from a complete line of one, two, three and four-deck models ranging in size (actual screening area) from 2½' x 4' to 5' x 12'.

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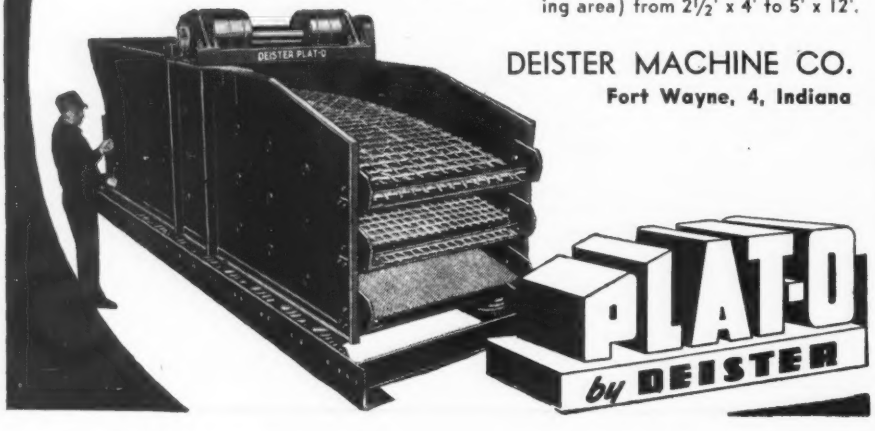

the Hudson Coal Co., is serving as acting chief of the Anthracite Distribution Division of the Solid Fuels Administration in place of Robert F. Duemler, who resigned to become vice president of the Delaware, Lackawanna & Western Coal Co. LANE W. HILDRETH is assistant acting chief of the division.

WILLIAM S. SPEED, president, Black Star Coal Corp., operating in Harlan County, Kentucky, has been elected to the board of trustees of the University of Louisville by the Board of Aldermen of that city. Mr. Speed and his family have been liberal contributors to the university during the last quarter century, being largely responsible for the Speed Scientific and Engineering School and other buildings on the campus.

T. H. BOOTH, formerly mining engineer for the Keane Mountain (Va.) and New River (Tenn.) operations of the Red Jacket Coal Corp., has been appointed chief engineer of the Eastern Coal Corp., Stone, Ky.

JOHN RAYMOND has been promoted from general mine foreman to superintendent of Esco No. 10 mine, Utilities Elkhorn Coal Co., Esco, Pike County, Ky.

W. E. SELLARDS, Huntington, W. Va., president of the Left Fork Fuel Co., has been appointed general manager of the Margarette Coal Corp., which operates a mine at Marfrance, in Greenbrier County. He will continue as president of the Left Fork Fuel Co., which will open a new mechanized mine on leased land near the Margarette property. His office will be in the Guaranty Bank Building, Huntington, W. Va.

GRIFFITH MORRIS, Princeton, has been named by Governor Gates as director of mine inspection in the Indiana State Division of Labor. He succeeds HENRY S. WALLACE, Shelburn, who resigned Jan. 31.

ARTHUR H. LEWIS, chief mining engineer, Glen Alden Coal Co., Scranton, Pa., has retired.

•

Muhlenburg Branch Of L. & N. Under Way

Construction of a 2.1-mile extension by the Louisville & Nashville R. R. in Muhlenburg County, Kentucky, to be known as the Paradise Branch began Dec. 18. It will extend from Peanut to reach the Kirk Coal Mining Co.'s Paradise tract of about 6,000 acres of coal land between the Pond and Green rivers. It also will facilitate access to coal properties of the W. A. Wickliffe Coal Co. lying south of the Paradise tract. This tract also comprises about 6,000 acres.

•

Equipment Approved

One approval of permissible equipment was issued by the U. S. Bureau of Mines in December, as follows: Goodman Mfg. Co.—Mancha two-motor truck; Approval 1534; Dec. 4.

Should I use water lubrication?
or what about oil lubrication?
Is this an open-impeller application?
or should I have closed impellers?

Here's an important advantage that Fairbanks-Morse offers

There are a number of different types and designs of vertical pumps. Each has its advantages or disadvantages, depending upon the exact nature of the job it is to be used upon. Some companies feature one design, others another design. *But Fairbanks-Morse builds* ALL *the major types of vertical pumps.*

This means that Fairbanks-Morse engineers are not limited in their choice of pump designs, but—*regardless of your water-moving job*—can supply you with the exact type of pump best suited to *your particular* requirements.

For example . . .

Water Or Oil Lubrication! If your job calls for uncontaminated water and simplified maintenance, a Pomona *Water-Lubricated* Pump—the pump that pioneered water lubrication—is the one to use. Or, for applications where the nature of the water or installation requirements make oil lubrication more practical, choose a Fairbanks-Morse Oil Lubricated Pump. Pomona, Fairbanks-Morse engineers supply BOTH types, assuring an absolutely unbiased recommendation on the pump best suited to *your* needs.

Open Or Closed Impellers! Pomona's semi-open impellers are famous for their ability to handle pulpy or grit-laden waters, and their ready adaptability to varying flow requirements with proportionate savings in power. But if your job calls for a closed impeller pump—a type also built by Fairbanks Morse—then Pomona, Fairbanks-Morse engineers are free to recommend it. As a result, *whatever your job,* you are assured of the best possible design to fit the requirements of *your* particular pump applications!

In Addition...

In the vertical pump field Fairbanks-Morse not only builds all the major types of vertical *turbine* pumps, but also manufactures vertical *centrifugal* pumps in a wide range of sizes. This gives a still wider selection of vertical pumping equipment to meet the specific requirements of any type of installation.

OUR TRAINED ENGINEERS, widely experienced in the application of the various types of Fairbanks-Morse Pumps, will be glad to make recommendations and work with you in the most efficient solution of your water-moving problem. A letter, wire or phone call places this engineering "know how" at your service. Fairbanks, Morse & Co., Chicago 5, Illinois.

Fairbanks-Morse

A name worth remembering

Diesel Locomotives • Diesel Engines • Generators • Motors • Pumps • Scales
Magnetos • Stokers • Railroad Motor Cars and Standpipes • Farm Equipment

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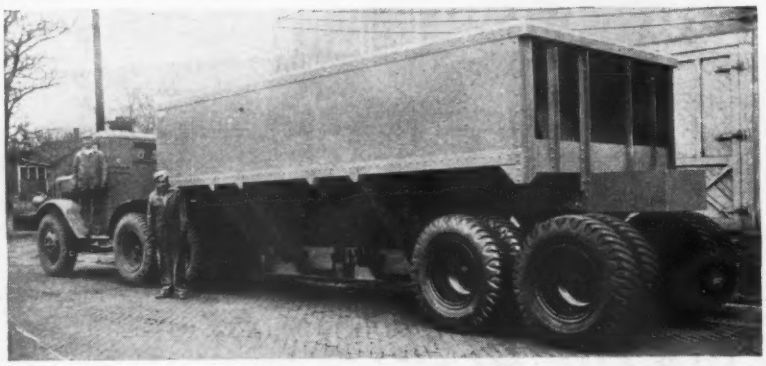
"UNITED" SEMI-TRAILER



IT makes no difference about the size, we build these remarkable Automatic Semi-Trailers in any capacity to suit your particular requirements and regardless of size, every "United" Automatic is so designed to give you minimum dead weight, and, at the same time, ample margin beyond the actual structural requirements for hard service and long life. This has been the policy of United Iron Works Co. through the years.

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Engineers - Founders - Manufacturers of Coal Mine Equipment

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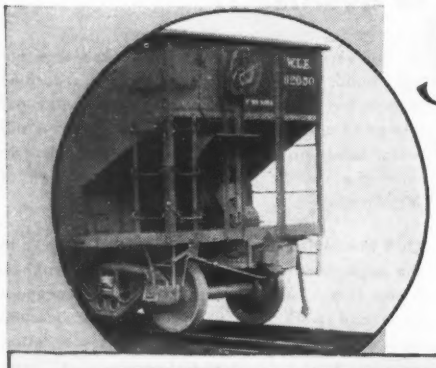
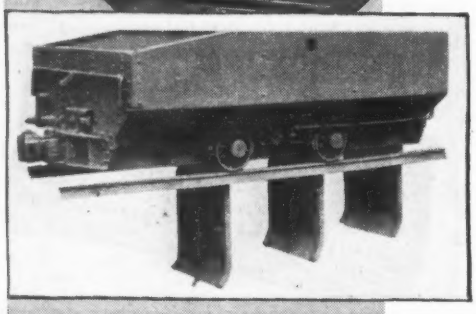


Safety in coupling

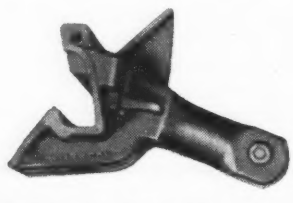
and uncoupling of cars is just as essential in mine operation as on the railroads.

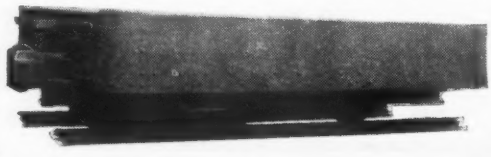


• **Willison Automatic Couplers**

for mine cars make it unnecessary for men to go between the cars, and also speed up train operation by faster shunting and gathering of cars, smoother operation of train and less spillage of coal.

Specify "Willisons" and save valuable time.





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CLEVELAND . . . . . OHIO

Call Goes Out For Wage Talks

Bituminous coal contract negotiations will open in Washington March 1 under a call sent out Jan. 13 by the joint conference representing the operators and the United Mine Workers. The call, dated Jan. 12, is in compliance with a clause of the existing agreement, which expires March. 31. The union will draft demands at a meeting of its policy committee February 26.

•

Supervisors' Panel Concludes Hearings

Final testimony and oral arguments of counsel in the mine foremen's organization case involving the Ford Collieries Co., Pittsburgh Coal Co., Rochester & Pittsburgh Coal Co., Republic Iron & Steel Co. and the H. C. Frick Coke Co. were presented Jan. 9 and 10 in Washington before the special panel of the War Labor Board set up to take testimony and make findings.

Counsel for the Pittsburgh, Frick and Republic companies moved for dismissal of the proceedings, contending there had been no evidence of any grievance involving supervisory officials of their organizations, but the WLB panel chairman deferred a ruling on these motions. Heath S. Clark, president of Rochester & Pittsburgh, contended that the organization of the foremen's union was clearly a breach of the existing wage agreement between the operators and U.M.W.; that the U. M.W. had disclaimed any intention of including any of the supervisory personnel in their bargaining with the operators, and that although the supervisory union now claimed to be autonomous the evidence presented clearly showed it to be an affiliate of U.M.W. through District 50.

In rebuttal, counsel for the union denied that the record sustained the operators' contention that the basic wage agreement had been violated by unionization of the supervisory forces and contended the foremen's union was a spontaneous movement and that it was completely autonomous.

•

Steam Locomotive Research Under Way

Determined to develop a coal-burning locomotive that will meet the diesel on any basis, the bituminous coal industry and the railroads have launched a research program. To carry on the work under the general auspices of the research association, Howard N. Eavenson, president of Bituminous Coal Research, Inc., announced Jan. 12 the formation of a committee. The committee will include R. B. White, president, Baltimore & Ohio R. R. (chairman); J. D. Francis, president, Island Creek Coal Co.; George Humphrey, president, Hanna Co.; Grant Stauffer, president, Sinclair Coal Co., and Dr. H. J.

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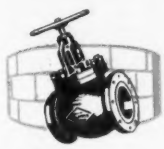
WHERE external fire hazards threaten valves with abnormal heating and sudden cooling that might crack other valves.



WHERE conduction of hazardous liquids or gases, as in petroleum or chemical services, requires valves of exceptional toughness.

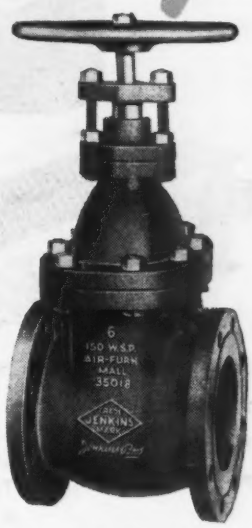
WHERE vibration, shock, or water hammer, individually or in combination, would break valves of other metals.

WHERE a higher corrosion resistance is essential, as in mine, chemical, marine, petroleum and similar services.

WHERE valves are subjected to freezing, or sudden and extreme variations of temperature are a condition of service.

WHERE valves are exposed to destructive atmospheric conditions, such as salt air or corrosive fumes from acids or chemical solutions.

provides a much-needed New Valve for war-burdened industry



Leading again in the drive for greater valve economy, Jenkins introduced the *Air Furnace* Malleable Iron Valve over a year ago.

Developed for certain "tough spots" where shock and strain run up abnormally high repair and replacement costs, these new valves have provided savings well beyond original estimates in many industries. By lasting longer, and requiring less attention, they help materially to conserve valves, and spread scarce maintenance man-hours further.

Next time you order valves for use *where steam pressure does not exceed 150 lbs., and where temperature is not above 450° F.,* check service conditions closely. If the valves must "take a beating", for any of the reasons listed at left, consider Jenkins *Air Furnace* Malleable Iron Valves.

Air Furnace MALLEABLE IRON VALVES

approved and used in these industries

Petroleum • Metal and Coal Mining • Chemical • Paper Synthetic Rubber • Food • Cement • Process Industries Power Plants • Marine • and many other fields where valves are subjected to unusual strains, vibration and destructive service conditions such as those described.

Write for Bulletin No. 192 describing this complete line, in many patterns, sizes 2 in. to 6 in. Write to Jenkins Bros., 80 White Street, New York 13, N. Y. Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago. Jenkins Bros., Ltd., Montreal; London.

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SINCE 1864

For every Industrial, Engineering, Marine and Commercial Service . . . In Bronze, Iron, Cast Steel and Corrosion-resisting Alloys . . 125 to 600 lbs. pressure

Sold Through Reliable Industrial Distributors Everywhere

FOR DURABILITY

Specify P-G STEEL GRID RESISTORS

- ★ ALL STEEL CONSTRUCTION
- ★ MICA INSULATION
- ★ RUGGED TERMINALS
- ★ PROVISION FOR EXPANSION
- ★ ADEQUATE VENTILATION
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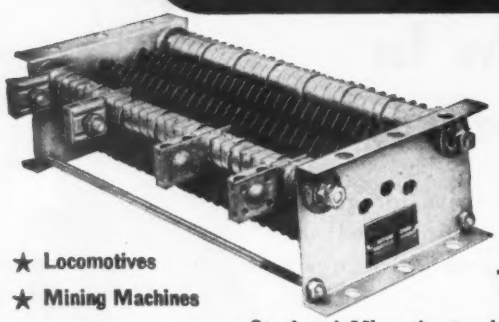
- ★ MOISTURE RESISTANT
- ★ CORROSION PROTECTED



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★ Mining Machines
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Steel and Mica, the two basic materials entering the construction of P-G Steel Grid Resistors, are the foundation for CONTINUOUS TROUBLE-FREE resistor service. P-G uses these materials in a unique design to provide both for expansion and for maximum ventilation.

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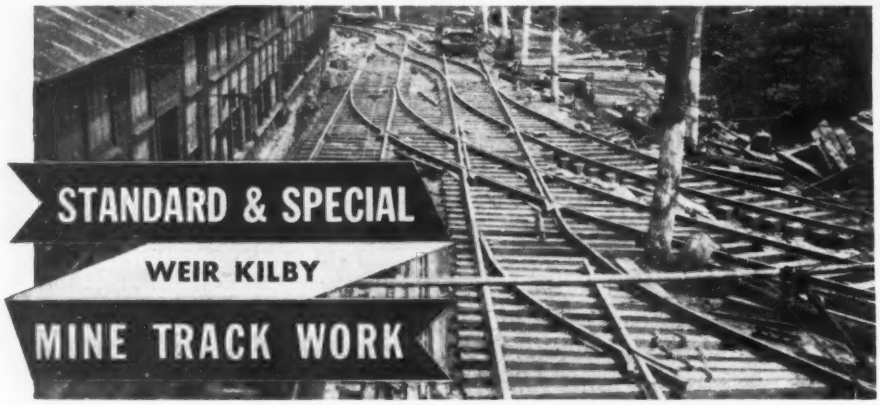

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MINE TRACK WORK

One of the surest ways to speed up coal production in these days of phenomenal demand, is to plan at once for the most efficient possible trackage, inside and outside the mine. Weir Kilby has developed many light weight and medium weight elements of track work especially for the mines.

We constantly carry in stock hundreds of mine turnouts, complete with Weir Titan Frogs, switch points, and stands in the standard angles and various rail sections, so as to facilitate immediate shipments. For other needs, your orders will be made up in the shortest possible time.

CATALOG "H" comprises 154 pages of helpful data, replete with photos, drawings and specifications, covers every track work need. A request on your letterhead will bring your copy promptly.

Suppliers to Mines and Railroads Since 1882

WEIR KILBY CORPORATION
CINCINNATI 12, O. BIRMINGHAM 7, ALA.

Rose, director of research, Bituminous Coal Research, Inc.

The committee was formed following a conference held in New York Jan. 12, attended by Mr. White; J. B. Hill, president, Louisville & Nashville R. R.; Gustav Metzman, president, New York Central R. R.; W. J. Jenks, president, Norfolk & Western Ry.; C. E. Newton, president, Chesapeake & Ohio Ry.; Dr. Compton, president, Massachusetts Institute of Technology, and Dr. A. A. Potter, dean, Purdue University.

Railroads cooperating in this research move, involving a $1,500,000 pool the purpose of which is to insure continued demand for bituminous coal originating on their respective lines, are the Chesapeake & Ohio, Baltimore & Ohio, New York Central, Pennsylvania, Louisville & Nashville and Norfolk & Western. Roads allied with the locomotive research but not as yet identified with the coal project are the Philadelphia & Reading, Virginian and Illinois Central.

Another development during the last month was an announcement by the New York Central that a 4-8-4 type coal-fired steam locomotive, to be known as Class S-1, is soon to be completed and delivered by the American Locomotive Co. With the acquisition of this giant newcomer there will be a total of 3,660 locomotives in the Central's pool of steam motive power. Differing from other experimental locomotives now being developed as part of railroads' plans for superior postwar transportation, the S-1 will follow conventional employment of steam motivating power through cylinders and driving rods. Because of a new design of its boiler and improvement of other parts, however, the S-1 is expected to exceed its predecessors in availability, horsepower and efficiency.

In connection with plans for locomotives of the great power of the S-1, a new design of high-capacity bed-type tender was prepared that could be used with a locomotive of 4-8-4 wheel arrangement and still be handled on a 100-ft. turntable. The new tenders are designed to carry 46 tons of coal and 18,000 gal. of water, but if experience develops the need for additional capacity, this can be provided. Twenty of these tenders have been constructed and installed back of Hudson type locomotives, with 45 still to be delivered.

In passenger service it is expected that sufficient tender capacity would be available for runs from Harmon, N. Y., to Chicago with only one stop for coal, which could be made during a crew change. In freight service the new tenders should make it practicable to operate over two divisions without having to take coal en route.

In conjunction with these advancements in steam locomotive design, studies also are being made by the Central in connection with track, signals and maintenance facilities as they affect the locomotive performance.

The New York Central R.R. made application Jan. 23 to the Interstate Commerce Commission for permission to purchase 19 diesel switching locomotives, to be built by the American Locomotive Co. at a cost of $1,140,080.

CAN YOU SOLVE THIS ONE?

A train leaves New York every day for San Francisco at the same time a train leaves San Francisco for New York. These trains require seven days to cross the continent. (For instance, the train leaving Monday arrives at its destination the following Sunday evening.) If you were on the train leaving New York on Monday — how many eastbound trains would you meet by the time you pulled into San Francisco?

Many problems in the application of industrial rubber products have been solved within the broad scope of the Thermoid Line*. Thermoid representatives in all parts of the country have had long experience in specifying the most efficient Thermoid Products for all types of installations. Working hand in hand with these representatives, Thermoid's Engineering and Research Staffs guide Thermoid's extensive manufacturing facilities in the successful solution of countless industrial rubber products problems.

This combination has been consistently successful in widely diversified fields. Thermoid has produced results where results meant either an improvement in production technique or an improvement in the finished product. Why not talk over your industrial rubber products problem with the Thermoid representative?

Solution to train puzzle: 14

DON'T PUT IT OFF 'TIL TOMORROW *Buy More War Bonds Today!*

Thermoid Rubber

IT'S GOOD BUSINESS TO DO BUSINESS WITH THERMOID

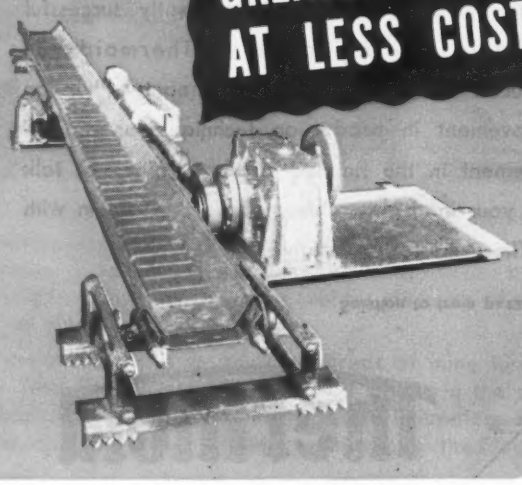
DIVISION OF THERMOID COMPANY
TRENTON, NEW JERSEY

*THE THERMOID LINE INCLUDES: TRANSMISSION BELTING • F. H. P. AND MULTIPLE V-BELTS AND DRIVES • CONVEYOR BELTING • ELEVATOR BELTING • WRAPPED AND MOLDED HOSE • SHEET PACKINGS • INDUSTRIAL BRAKE LININGS AND FRICTION PRODUCTS • MOLDED HARD RUBBER AND PLASTIC PRODUCTS.

EFFICIENT OUTPUT MEANS MORE PROFIT

and La-Del Shaker Conveyors Spell

"GREATER OUTPUT AT LESS COST!"



Today's most practical and efficient method of producing more coal at less cost per ton can be found in La-Del Shaker Drive Underground Conveyors. An integral unit of simple design, it features La-Del *cushion stroke.* This is an exclusive feature that reduces shock loads on all mechanical parts which, in turn, effects a substantial reduction in power consumption.

Additional advantages of La-Del Shaker Drive Conveyors include:

- Assured flexibility . . . turns may be installed to move the conveyor at 90 degrees across the face, or at practically any angle.
- Easy and simple reductions or extensions in length may be made at a moment's notice.
- Side extensions may be quickly added to either or both sides, wherever needed.
- Elimination of many mechanical parts guarantees low maintenance.

If you're looking for a coal conveying system that will *move more coal at less cost*—turn to La-Del Shaker Drive Conveyors. For complete facts on all La-Del Underground Equipment, write today. La-Del Engineers are at your service.

OTHER LA-DEL MINING EQUIPMENT

Underground Chain Conveyors • Belt Conveyors • Elevating Heads • Pit Car Loaders • Mobile Loading Machines • La-Del Troller Mine Ventilating Fans and Blowers. And La-Del Experienced Engineering Counsel—Before and After Installation.

MATERIAL HANDLING LA-DEL MINE VENTILATION

LA-DEL CONVEYOR AND MANUFACTURING CO.

New Philadelphia, Ohio

COMPLETE LINE OF UNDERGROUND CONVEYORS FOR LOW COST OPERATION

Refuse Wage Advance In Eastern Canada

The National War Labor Board of Canada announced Jan. 16 in Montreal that it refused to grant wage increases and two weeks' vacation with pay to coal miners in Nova Scotia and New Brunswick. The United Mine Workers of America had asked that all basic rates in mines in this area be brought to the same level as those in western Canada.

The Royal commission named to investigate the Canadian coal industry, held its first meeting Jan. 16 at Sydney N. S. The group, which includes Justice W. F. Carroll, Halifax (chairman); Angus J. Morrison, United Mine Workers official, and Justice C. C. McLaurin, Calgary, convened at the Sydney Court House. H. J. Kelley, vice president and general manager, Dominion Steel & Coal Corp., who welcomed the commission, expressed the hope that the body's report would point the way to a solution of problems facing the industry. Other hearings are planned throughout the Dominion.

Canada's coal output for 1944, it was reported Jan. 5, totaled 17,118,008 tons, compared with 17,859,057 tons in the preceding year. Assistance given by the release on leave of 2,000 soldier coal miners is credited with having prevented production from falling lower.

•

Draft Formula For Critical Activities

Selective Service has forwarded instructions to local draft boards outlining the procedure to be followed in carrying out the recommendations of War Mobilizer Byrnes with regard to the selection of men in the 26-29 age group for the armed forces, together with the War Manpower Commission's new list of essential and critical activities.

Emphasizing the necessity for careful selection of men from this group so as to give the greatest possible protection to war production, these instructions request local draft boards to follow a priority system that would call such registrants in the following order: (1) those not employed in any of the activities on the list; (2) registrants in *relatively unimportant* jobs in *essential* but not critical activities (3) registrants employed in *relatively unimportant* jobs in *critical* activities (4) registrants engaged in *relatively more important* jobs in essential but not critical activities; (5) registrants engaged in *more important* jobs in *critical* activities. A registrant for whom a replacement is available is to be classified as available for induction regardless of his place in the group listed above.

The new WMC list covers 35 groups of essential and critical activities and is practically the same as WMC's previous "list of essential activities." All the activities in the new list are rated as essential activities for the new draft priority set-up, but some activities in the various groups have been designated as "critical" and are shown in capital letters. No attempt has been made to indicate the relative importance of different occupations in any of the activities

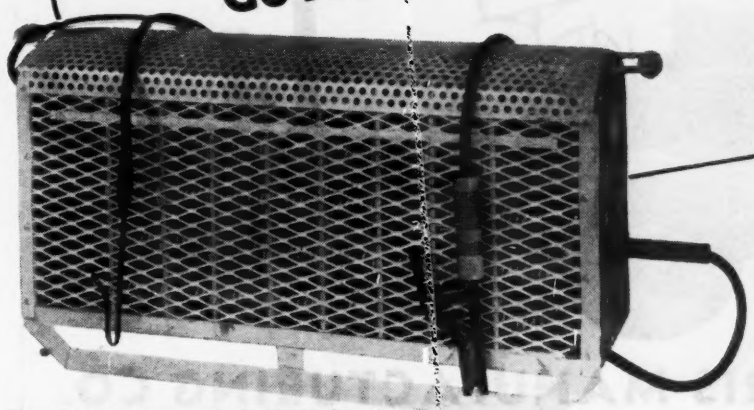
Here's

A PORTABLE ARC WELDER

for faster easier repairs and Bondwelding

The GUYAN Arc Welder is ruggedly built to take abusive handling . . . can easily be moved from place to place, even in low coal. It's narrow, thus it's easy to load and unload and is equipped with flush sockets to prevent damage. Handles are placed away from coil heat, thus the unit can be moved as soon as each job is done. For more details write to

GUYAN MACHINERY CO.
Logan, W. Va.



These distributors can supply GUYAN Equipment: Bluefield Hardware Co., Bluefield, W. Va. • Close Distributing Co., Pittsburgh, Pa. • W. M. Hales Co., Chicago, Ill. • Mechanical Mining Service Co., Wheeling & Morgantown, W. Va. • Mill & Mine Supply Co., Birmingham, Ala. • Rogan & Rogan Co., Middlesboro, Ky. • Union Supply Co., Denver, Colo. • Universal Supply Co., Beckley, W. Va. • Wilkes-Barre Equipment Co., Wilkes-Barre, Pa.

PUT AN END TO UNLOADING HEADACHES

Freezeproof your coal with WYANDOTTE CALCIUM CHLORIDE

Dealers have reason to groan when coal is frozen in the car. It means lost delivery time and extra labor—and everybody knows what important considerations those are nowadays.

Save hard-pressed dealers this added burden by treating your coal with Wyandotte Calcium Chloride. It will unload readily even in sub-zero weather, coming out of the car the same grade as when loaded.

The expense is small and no special equipment is needed to handle Wyandotte Calcium Chloride for freezeproofing. You'll profit in dealer good-will.

This coupon will bring you full information about Wyandotte Calcium Chloride—the safe, dependable and economical agent for treating coal. Mail it today.

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MICHIGAN ALKALI DIVISION
Wyandotte, Michigan

Send me literature and further information about the uses and advantages of Wyandotte Calcium Chloride.

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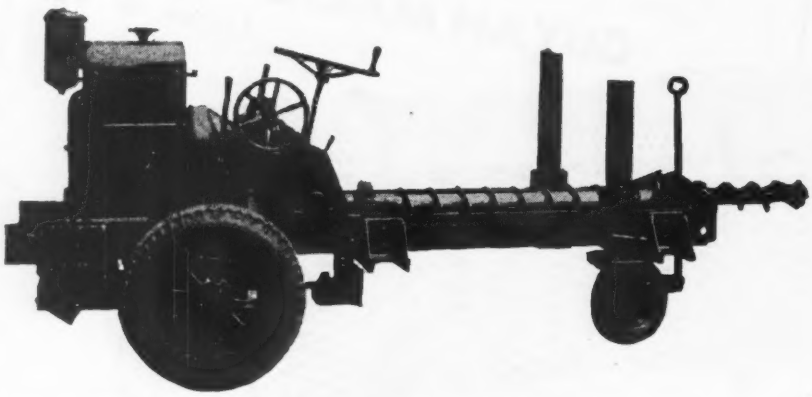
PARMANCO Horizontal Drills

"Positive Control Drilling"

Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling — All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators — Write us your drilling problems.



PARIS MANUFACTURING CO.

PARIS, ILLINOIS

• Compact—mobile—convenient — the Lee - Norse Greasing Truck provides a complete "service Station on wheels" and permits regularly scheduled greasing of all mining equipment at the face.

This modern truck has a six - barrel capacity with three or more standard lubricants:

- ***Hydraulic Oil***
- ***Transmission Lubricant***
- ***High Pressure Chassis Lubricant***

For greater efficiency in your mine, use Special Equipment by Lee-Norse.

We also completely overhaul and factory rebuild various kinds of mining machinery—cutters—loaders.

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listed with the single exception that all technical, scientific and research personnel engaged in any of the activities in the list, *whether or not the activity* appears in *capital letters or small letters*, are regarded as being engaged in *critical* activities.

The essential and critical listing of particular interest to the coal mining industry are as follows:

"9. *Coal Mining.*—THE MINING OF ANTHRACITE, BITUMINOUS AND SEMI-ANTHRACITE COAL, lignite and peat, and the operation of breakers or preparation plants. Includes also removing overburden and other such activities preparatory to coal mining operations."

•

Colcord to Be Part Of ARMCO Mining Div.

Colcord Coal Co., a wholly owned subsidiary of the American Rolling Mill Co., was dissolved Dec. 31 and the business and assets transferred to the parent company. The properties will be operated as part of the mining division of ARMCO. There will be no change in operating personnel. Charles W. Connor, formerly vice president of Colcord, is manager of the mining division of ARMCO and C. E. Hough is general superintendent. For the present headquarters of the mining division will be retained at Montcoal, W. Va.

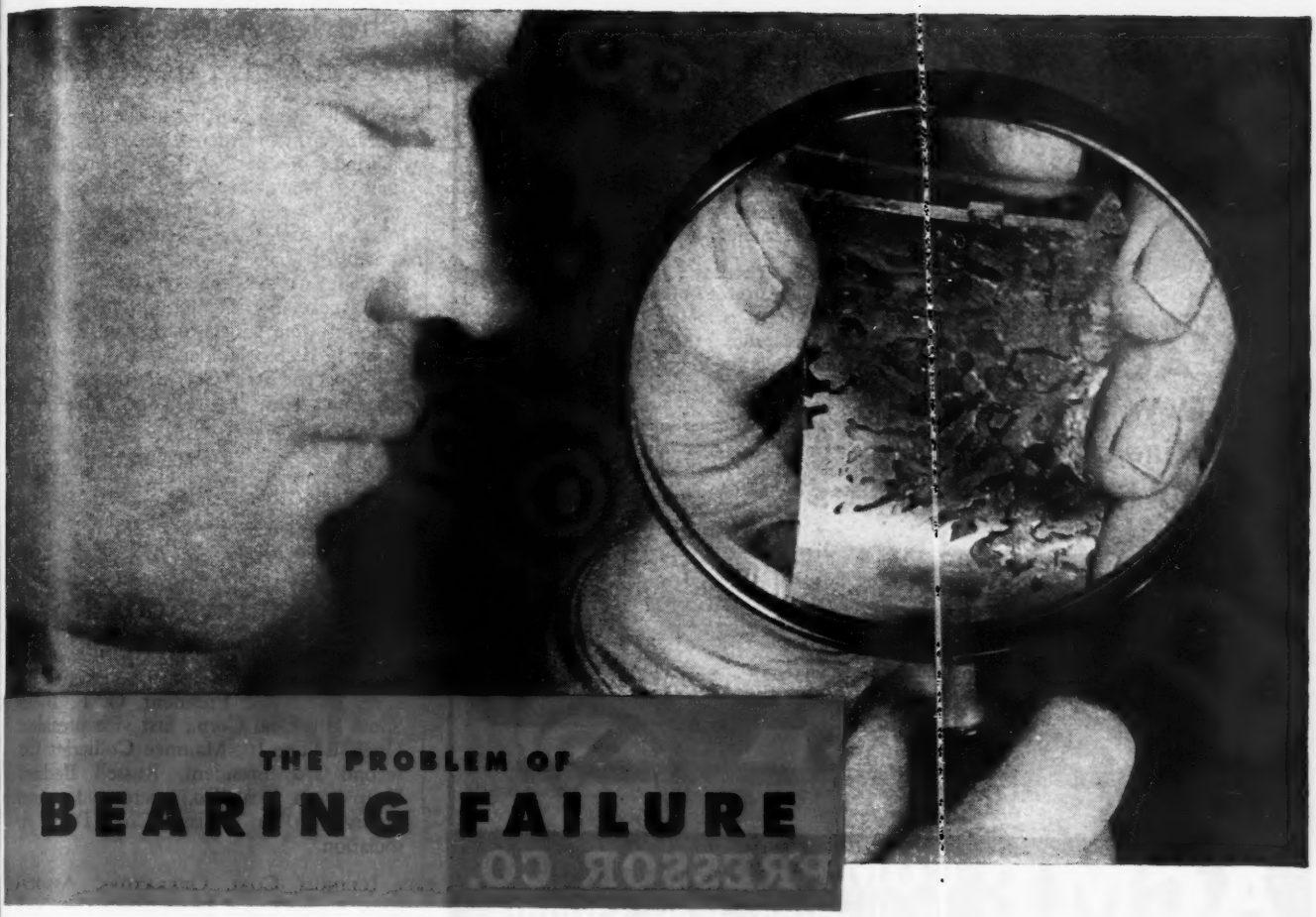
The safety record of the ARMCO mining division showed a 55 percent improvement in 1944 in frequency and 78 percent in severity over 1943 despite a 14 percent increase in hours worked by employees, according to Mr. Connor. West Virginia mines included in the figures are Nellis, at Nellis; Stickney, Montcoal; Dorothy, Montcoal; and Henshaw, Montcoal.

•

Budget Estimates For Bureau of Mines

The budget for the fiscal year 1946, beginning July 1, 1945, submitted to Congress by the President contains an estimate of $180,400 for salaries and expenses in administering the U. S. Bureau of Mines, compared with the 1945 appropriation of $76,165. The budget estimate for the coming year for operating rescue cars and stations and accident investigation by the Bureau of Mines is $764,000, compared with $797,595 appropriated in the preceding fiscal year. For coal-mine inspection and investigations (under the Federal Coal Mine Inspection Act, 1941) the budget estimate is $985,000; for enforcement of the Federal Explosives Act, $484,800 and for testing fuel, $341,000.

The budget estimate to finance construction and operation of demonstration plants to produce synthetic liquid fuels from coal, oil shales, agricultural and forest products, etc., is $13,000,000, contrasted with an appropriation of $5,000,000 last year. The sum of $583,000 was budgeted for oil and gas investigation by the Bureau of Mines; $862,000 for mining experiment stations; $143,450 for the care of buildings and grounds at Pittsburgh and Bruceton, Pa.



THE PROBLEM OF BEARING FAILURE

SUCH THINGS as load, speed and temperature have a very material effect on the life of automotive bearings. Sometimes bearing failures are caused by dirty lubricating oil. When the oil is contaminated with water, fuel, sand, dirt, carbon particles or finely divided metal, excessive wear in the bearings results. Present day driving conditions which tend to create low temperature sludge, clog oil lines and screens and result in burned out bearings.

A great many bearings are ruined by overloading (lugging) and overspeeding the engine; by such driving habits as the prolonged use of the engine as a brake in low gear, down long grades; continuous driving at top speeds; failure to shift gears on hard pulls.

WHY BEARINGS FAIL

1. FATIGUE FAILURE: Due to several causes. Among them: overloading; overspeeding; deflections of crankshaft; insufficient oil clearance or stoppage of oil supply; distortion due to poor fit of bearing inserts; out-of-round crank pins and crankshaft journals. As a result of fatigue failure, the bearing metal cracks and flakes out, the rod portion of the bearing failing first, then the bearing cap.

2. WEAR FROM DIRT: The result of infrequent draining and flushing of the crankcase or infrequent servicing of the air and oil bath cleaners.

3. WIPING: Friction heat often causes the bearing metal to melt and run, or to become soft and plastic. This in turn allows the bearing metal to wipe or smear against the harder metal surfaces of the crank pin or bearing journal, cracking and wiping the bearing metal. The causes for this failure are: lack of oil; plugged oil passages; clogged pump screen; worn oil pump; leaky oil pump suction line; broken oil lines or connections; misfit bearings.

4. CORROSION: Prolonged high speed driving and overloading will produce crankcase oil and bearing temperatures above 250° F. in most late model engines. At such temperatures most lubricating oils are subject to oxidation and consequent production of organic acids that are corrosive to bearing metals. The remedy is to use lubricating oils that won't readily form corrosive acids and to drain and flush crankcases frequently.

WATCH DRIVING AND SERVICING

To avoid bearing trouble, don't overload; don't brake with the engine for prolonged periods of time; don't use all your horsepower any more than you have to. Have your engine serviced at more frequent and regular intervals. Use only the best lubricating oil obtainable.

RING-FREE MOTOR OIL HELPS PREVENT BEARING FAILURES

Macmillan Ring-Free Motor Oil has the properties that guard against bearing failure. It has high film strength; high heat resistance; a long cling to the vital parts of your engine; fast penetration. It has a cleansing action that washes away carbon particles, carrying them into the crankcase where these impurities are drained at time of oil change.

FREE FOLDER *on "Bearing Failures—Causes and Corrections"*—Send today for your copy. Address Macmillan Petroleum Corporation, Room 1003, 530 West Sixth Street, Los Angeles 14, California

MACMILLAN RING-FREE MOTOR OIL

MACMILLAN RING-FREE MOTOR OIL

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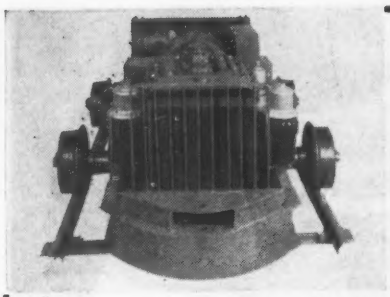


FRONT VIEW OF COMPRESSOR

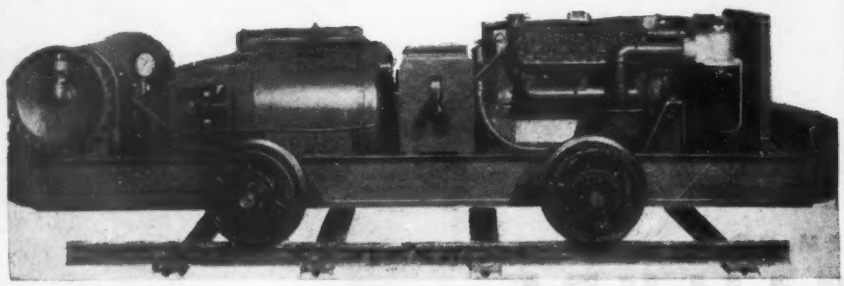
ACME
"LOWBOY"
Mine Car
COMPRESSOR

Here's the last word in mine car compressors—light in weight—low in height—compact—mobile—and delivers 92 cu. ft. of air per minute at 100 lbs. pressure.

It is designed specifically for mine service and is adaptable to both high and low seam operation. It is particularly good in mechanized mines.

The Acme "Lowboy" operates on either 230 or 500 DC current and is equipped with a 25 H.P. motor. The compressor unit is an adaptation of the Schramm Fordair which has been so successful in many construction fields.

For complete information on this modern, efficient mine car compressor giving details of construction and complete specifications write for Bulletin No. 3920.

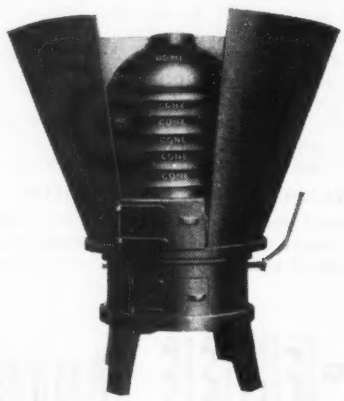


ACME COMPRESSOR CO.
Williamson, West Virginia

PERFECTION
Cone Stove Sand Driers

dry twice as much sand
at half the usual cost!

Simple in design and function, the PERFECTION Cone Stove Sand Drier will dry *more* sand in *less* time. . . . and it requires only half the fuel and labor involved in ordinary methods! Insure an adequate supply of really dry sand for your haulage requirements. Prove the "PERFECTION" Sand Drier in your own operations! Write today for complete information.



Princeton FOUNDRY & SUPPLY CO.
Princeton, West Virginia

Charles Allen Named Head Col. Fuel & Iron

Charles Allen, partner in the investment banking firm of Allen & Co., was elected chairman of the board of the Colorado Fuel & Iron Corp. Jan. 17, succeeding Arthur Roeder, resigned. The election followed soon after acquisition of stock control of C. F. & I. by Allen & Co. and associates from John D. Rockefeller Jr. and Rockefeller Center, Inc. Five new directors were added to the board, as follows: E. Perry Holder, president, Wickwire Spencer Steel Co.; Charles G. Terry, vice president, Schoellkopf, Hutton & Pomeroy; Franklin Berwin, vice president, Polarus Steamship Co.; and Jacob L. Holtzmann, attorney. They fill vacancies caused by the resignations of Bertram Cutler, Carl Schmidlapp, Fred Farrar and J. F. Welborn.

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Association Activities

INDIANA COAL PREPARATION AND UTILIZATION SOCIETY has installed new officers as follows: President, G. F. Bieler, Snow Hill Coal Corp.; first vice president, Hugh B. Lee Jr., Maumee Collieries Co.; second vice president, Russell Bedwell, Deep Vein Coal Co.; secretary-treasurer, Henry O. Erb, Indiana Coal Trade Association.

ILLINOIS COAL OPERATORS' ASSOCIATION has reelected as president George F. Campbell, vice president and general manager, Old Ben Coal Corp. Other officers named include: Fred S. Wilkey, secretary; Thurlow G. Essington, general counsel; C. W. Peterson, treasurer, Bell & Zoller Coal & Mining Co., treasurer. Directors elected include D. W. Buchanan, president, Old Ben Coal Corp.; D. H. Devonald, vice president, Peabody Coal Co.; Hubert E. Howard, president, Binkley Coal Co.; E. R. Keeler, president, Franklin County Coal Corp.; T. C. Mullins, president, Northern Illinois Coal Co.; T. J. Thomas, president, Valier Coal Co.; A. H. Truax, president, Truax-Traer Coal Co.; William P. Young, Bell & Zoller Coal & Mining Co.; J. Roy Browning, president, Freeman Coal & Mining Co. Deciding that the executive board should serve as scale committee, the organization named the following subcommittee: Messrs. Devonald, Howard, Young, Campbell and H. A. Treadwell, vice president, Chicago, Wilmington & Franklin Coal Co. (Mr. Campbell ex-officio).

MONONGAHELA VALLEY COAL MINING INSTITUTE has elected as president Roy S. Brown, superintendent at Maiden mine, Kelleys Creek Colliery Co., Morgantown, W. Va.

WESTERN CANADA BITUMINOUS COAL OPERATORS' ASSOCIATION has elected as president J. R. Brusset, vice president and managing director, Western Canada Collieries, Ltd., Blairmore, Alberta, vice A. N. Scott, Luscar. Other officers named were: vice president, J. A. McLeod, Cadomin; secretary-treasurer, Clement Stubbs; executive committee: Mr. Brusset, Mr. McLeod and R. M. Young, Canmore.

BLUE PRINT FOR BETTER DUST-SEPARATION!

- FOR GREATER TONNAGE
- MORE THOROUGH DUST REMOVAL
- LOWER OPERATING COST

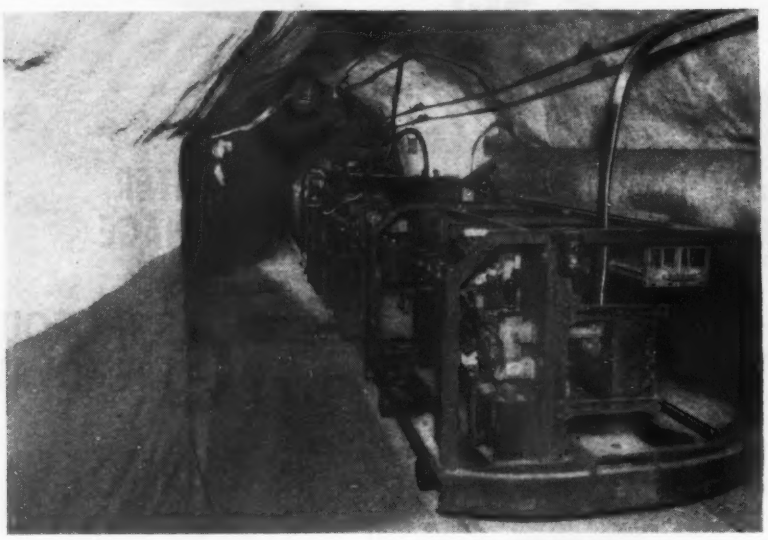
AIR-CLEANING FINES WITH THE STURTEVANT "WHIRLWIND" CENTRIFUGAL

As mechanical loading, the demand for a quality product and competition continue to increase, the rapid and economical cleaning of fine coal assumes greater and greater importance. The answer . . . air separation of dust from fines by the Sturtevant Whirlwind Centrifugal. The Sturtevant removes dust from any given fine mesh size of coal and delivers the tailings with no air escape, and consequently no dust problem. The whole operation is entirely contained in the machine.

The secret of Sturtevant efficiency in dust removal lies in the exact counterbalance and control of centrifugal force and air-currents to handle the particles with the highest efficiency—at lowest cost for POWER and MAINTENANCE. The Sturtevant is the result of 20 years of experience in designing and constructing centrifugal air separators for many different types of products. Its efficiency is proved by the fact that the Cement Industry, where air separation is most difficult and exacting, uses hundreds, continually re-orders, and has never rejected a single one.

SEND FOR BULLETIN 087

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



Above is an underground substation room which is lined with 2" mesh reinforced "GUNITE". Similar uses of plain and reinforced "GUNITE" in haulways and entries are saving money for many coal mines. We do the work or sell the equipment.

Write for our bulletin 2200 today

MANUFACTURERS OF THE "CEMENT GUN"

A HOIST TO FIT THE JOB

This Signal Corps picture, taken somewhere in France, shows U. S. Army Engineers using a Coffing "Safety-Pull" hoist in the construction of a treadway bridge.

Every day brings the war nearer to a successful conclusion and Coffing Hoists are doing their part, both on the war front and the home front.

Whether in mills, factories, mines, utilities, oil fields, construction, production or maintenance there is a Coffing Hoist that will help you do the job faster, better and more economically. Write for Catalog No. GG-6

COFFING HOIST COMPANY
RATCHET LEVER HOISTS - SPUR GEAR HOISTS - ELECTRIC HOISTS
LOAD BINDERS - DIFFERENTIAL HOISTS - TROLLEYS
DANVILLE, ILLINOIS

High Court to Review Portal-to-Portal Pay

The Supreme Court decided Jan. 2 to review the question of whether bituminous miners must be paid underground wages on a portal-to-portal basis, having granted a writ of certiorari in the Jewell Ridge case. The Fourth U. S. Circuit Court of Appeals ruled Oct. 6 at Asheville, N. C., that travel time is work time under the Fair Labor Standards Act, reversing the opinion of Judge A. B. Barksdale in the District Court at Roanoke. The majority decision of the appellate court was based largely on the U. S. Supreme Court ruling in the Alabama ore mines portal-to-portal travel time case rendered last March.

•

Preparation Facilities

Canyon Coal & Coke Co., Morgantown, W. Va.—Contract closed with Jeffrey Mfg. Co. for a tipple to handle 200 t.p.h., raw feed, of 0x4-in. coal.

Kanawha Mfg. Co., Charleston, W. Va. (for the New River Co.)—Contract closed with Jeffrey Mfg. Co. for one 2-compartment Baum jig to handle 230 t.p.h., raw feed, of 7x⅜-in. coal.

Rail & River Coal Co., Bellaire, Ohio—Contract closed with Jeffrey Mfg. Co. for one unit washer for 0x2-in. coal; capacity, 60 t.p.h. raw feed.

Knott Coal Corp., Inc., Anco, Ky.—Contract closed with Roberts & Schaefer Co. for hydro-separator washing equipment to clean 2x¼-in. coal at rate of 80 t.p.h.; plant to be completed March 1, 1945.

Lillybrook Coal Co., Killarney, W. Va.—Contract closed with Roberts & Schaefer Co. for Stump Air-Flow equipment and accessories to clean 0x⅜-in. middlings at rate of 50 t.p.h.; plant to be completed April 1, 1945.

Majestic Collieries Co., Majestic, Ky.—Contract closed with Roberts & Schaefer Co. for Stump Air-Flow equipment and accessories to clean ⅜x1¼-in. coal at rate of 125 t.p.h.; plant to be completed May 1, 1945.

Morea-New Boston Breaker Corp., Morea Colliery, Morea, Pa.—Contract closed with Wilmot Engineering Co. for two Type E Wilmot Simplex jigs to prepare broken and egg coal; total feed capacity, 150 t.p.h.

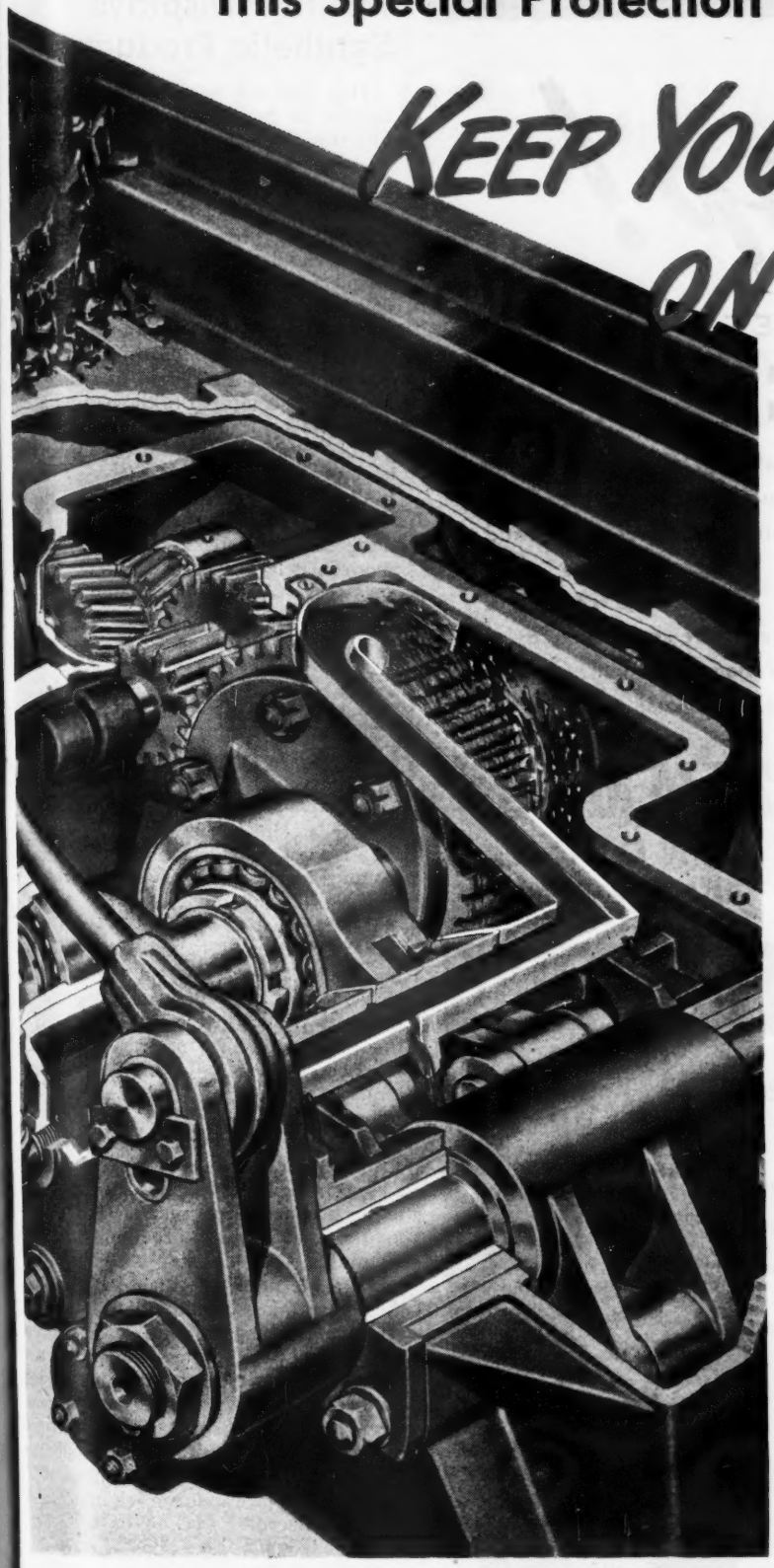
Jeddo Highland Co., Harleigh Breaker, Jeddo, Pa.—Contract closed with Wilmot Engineering Co. for one Type E Wilmot Simplex jig to prepare steamboat and broken coal; feed capacity, 75 t.p.h.

Lower Region Coal Co., Shamokin, Pa.—Contract closed with Wilmot Engineering Co. for one Type D Wilmot Simplex jig to prepare pea coal; feed capacity, 20 t.p.h.

Nay Aug Coal Co., Scranton, Pa.—Contract closed with Deister Concentrator Co. for eight "SuperDuty Diagonal-Deck" No. 7 washing tables to clean No. 4 buckwheat coal.

This Special Protection Against Shocks Helps

KEEP YOUR SHAKER ON THE JOB!



YOUR shaker conveyor drive is a brute for punishment. But like all of your other mechanized equipment, it must have the protection of Correct Lubrication to keep going without undue wear.

For example, the maze of bearings and gears shown at the left, require an oil that will flow freely to all moving parts and then form strong films that will resist rupture under constant shock loads.

Gargoyle Vactra Oil AA gives excellent performance in this difficult shaker-drive job. Its correct body assures complete distribution throughout the entire mechanism, and its strong adhesive films stand up under the continuous pounding.

This special oil keeps shakers on the job longer, keeps repair and replacement costs down to a minimum. Why not try it in your shaker drive for maximum operating efficiency?

Get Correct Lubrication for your Entire Plant with Socony-Vacuum Engineering

SOCONY-VACUUM OIL COMPANY, INC.
Standard Oil of N. Y. Div. · White Star Div. Lubrite Div. · Chicago Div. · White Eagle Div. Wadhams Div. · Magnolia Petroleum Co. General Petroleum Corporation of California.

Socony-Vacuum's FIVE STEPS to Lower Production Costs for You

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5. Progress Reports of Benefits Secured

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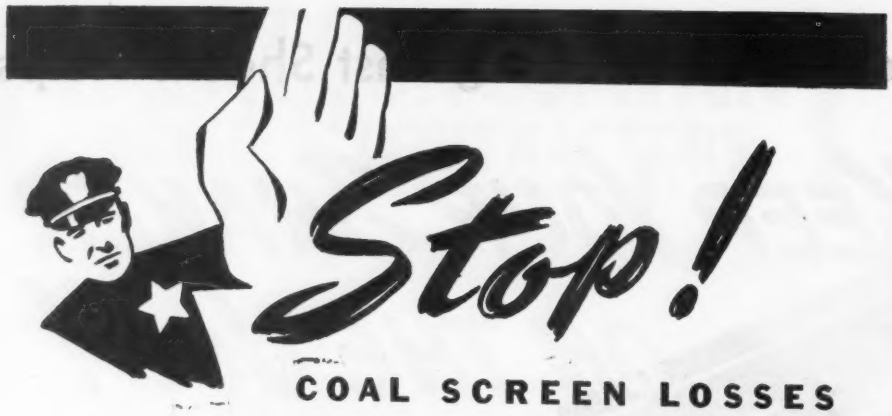

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use "BEE·ZEE" Round Rod SCREENS

ALL TYPES SCREENS

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- Hook-type Vibrator
- Shaker Panel
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For long life in dewatering, sizing and drying operations in coal preparation plants, "Bee-Zee" Round Rod Screens are the answer. Round-rod construction increases efficiency, lowers plant maintenance expense, assures more continuous operation. Bee-Zee Screens are manufactured for all types of coal preparation equipment. Our engineering service can help you—call on us today.

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for coal mining equipment, we give you a money-back guarantee of superior service.

Promet assures you a specific formulae designed to best serve each application. That's why it cuts maintenance cost.

Promet Bearing Bronze can be run without lubrication in case of emergency, even at a red heat, then suddenly cooled and returned to service without the least injury to its properties.

It will not cut, or stick to the shaft under ordinary operating conditions, and will not powder under the most severe conditions of service.

Promet Bearing Bronzes can be machined at speeds of more than 500 feet per minute—more than double those of phosphor bronzes.

PROMET BAR STOCK

(cored or solid) machines easily. Rounds, hexagons and squares, in rough cast, semi-finished, or fully machined. Cored bar stock in all sizes (by 1/8" steps) from a 1/2" minimum core to 12" O.D. and 12' lengths.

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Parts for Jeffrey, Goodman, Westinghouse, General Electric, Sullivan, Joy Equipment, etc.

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MT. LEBANON, PA., J. J. Nieser, 720 Roselawn Ave.	Phone LE 9876
DENVER, COLO., Urquhart Service, 18th Street at Globe	Phone Main 0331

Institute Displays Synthetic Products

How coal will help in the postwar production of beauty aids, plastics and textiles was the theme of an exhibition and reception given last month at the Hotel Plaza, New York, by the Bituminous Coal Institute.

Displays of cosmetics, nylon garments, coal dyes, plastic toilet articles and other products with coal as their bases were shown to an audience in large measure of metropolitan editors of women's publications and women's departments of daily newspapers. An exhibition of coal-derived perfumes as compared to the natural flower scents and a pair of genuine nylon stockings guarded by two uniformed detectives were features of the event.

The beauty and glamor industry, the institute said in a news release prepared for the event, will offer a postwar market of approximately a billion dollars. Bituminous coal will play a continuing large part both as a raw material and as a processing agent in production of such goods.

•

Anti-Stream Pollution Plans Approved

An extensive program to eliminate pollution of streams in Pennsylvania has been approved by the Postwar Planning Commission, Governor Martin states. A substantial sum—more than the $2,000,000 appropriation—will be sought from the 1945 General Assembly. It is planned to establish sewage-disposal authorities to aid municipalities in carrying out the necessary plans to clear the streams. The four principal causes of stream pollution have been found to be industrial wastes, municipal sewage, mining operations and soil erosion.

Immediate outlawing of dumping of coal-mine silt in streams of the State and stiff penalties for violation are provided in an administration measure introduced in the State House of Representatives. Submitted as House Bill No. 1 by Rep. Charles H. Brunner (R., Montgomery), the measure also would ban discharge of acid mine drainage into clean waters and permit the State Sanitary Water Board to purchase land to divert such waste to polluted waters. Appropriations of $11,000,000 to the Department of Forests and Waters and $12,325,000 to the Department of Health, most of it designed for postwar stream clearance, also were introduced.

•

9 Die in Gassy Mine

Rescue crews on Jan. 18 found the bodies of nine men killed in a gas explosion in a mine operated by the Bond Valley Coal Co., a cooperative, 3 miles southwest of Haileyville, Okla. J. B. Puterbaugh, president, McAlester Fuel Co., which sent rescue crews to the scene, said the explosion, which occurred Jan. 17, was believed to have been caused by a breakthrough into an adjoining gas-filled abandoned shaft.

WORKING WHERE IT'S WET?

Get to know "Monobel" AA —a new water-resistant permissible

Du Pont developed "Monobel" AA to meet the need for a dependable, water-resistant coal producer.

"Monobel" AA is a new, strong, low velocity, ammonia permissible waterproofed by a basically new method. It is ideal for wet work in thick, hard-shooting seams regardless of whether top or bottom cutting is practiced. Furthermore, it costs less than gelatinous permissibles usually required for wet work of this type.

"Monobel" AA shoots coal for efficient mechanical loading . . . and it produces a high percentage of coarse coal, resulting in better realization.

Talk with your Du Pont Explosives representative for complete information. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington, Delaware.

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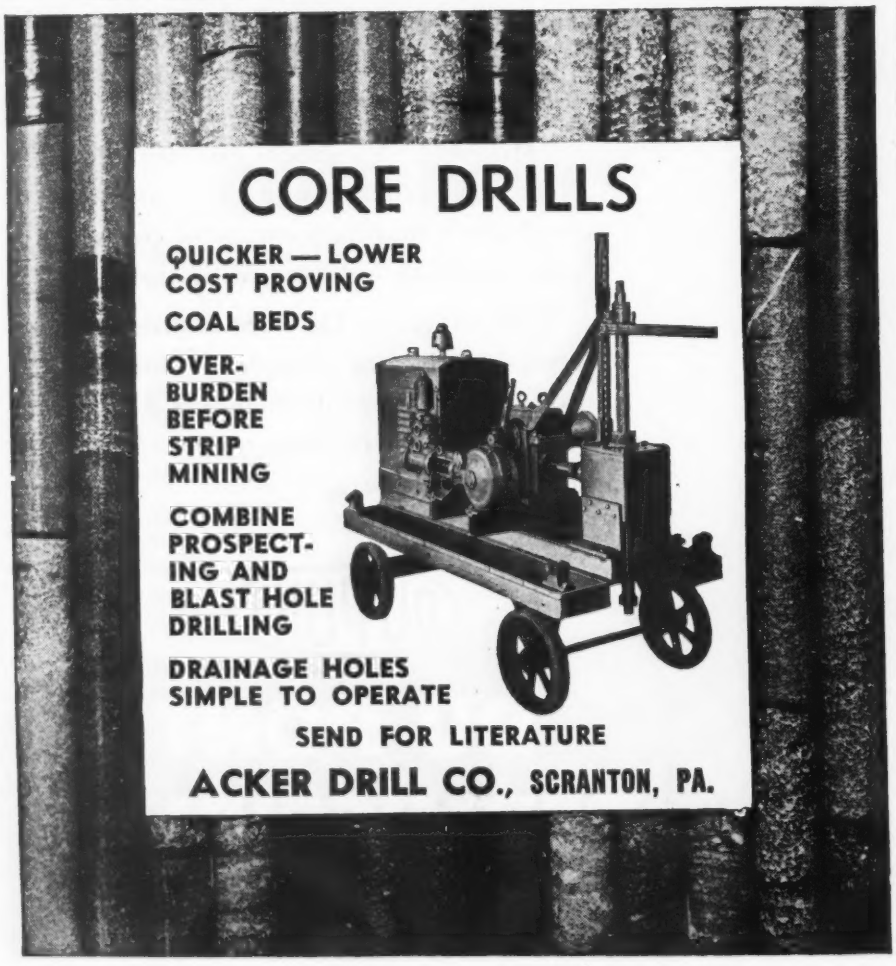
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QUICKER — LOWER COST PROVING COAL BEDS
OVER-BURDEN BEFORE STRIP MINING
COMBINE PROSPECTING AND BLAST HOLE DRILLING
DRAINAGE HOLES SIMPLE TO OPERATE
SEND FOR LITERATURE
ACKER DRILL CO., SCRANTON, PA.

Launches Petroleum Synthesis Process

A new commercial process to synthesize motor fuels and other hydrocarbon products of the petroleum range by the Fischer-Tropsch method has been announced by M. W. Kellogg Co., engineer and builder of refinery installations. This process, it is said, enables the refiner to produce motor fuel from natural gas of 75 A.S.T.M. octane number, clear—i.e., without addition of ethyl fluid—or Research octane number of 83. This product may be made for 5c. per gallon, based on 5c. per 1,000 cu.ft. of gas, and a plant depreciation rate of 10 percent per annum. The Kellogg company is prepared to build refining units employing this process for the refining industry, according to the announcement.

•

Site Selected For Packaged Fuel Plant

A site has been selected at 17th St. and Sedgley Ave., Philadelphia, on which will be constructed a plant to make packaged fuel, according to J. L. Mooney, manager, packaged fuel division, Blaw-Knox Co. Both the Pennsylvania and Philadelphia & Reading railroads will supply the necessary shipping facilities. The new product, containing 80 percent anthracite fines, is scheduled to be on the market some time in February.

•

Staff Changes Made by Hudson

Staff changes made by the Hudson Coal Co., Scranton, Pa., effective Jan. 1, according to Cadwallader Evans Jr., are as follows:

E. C. Weichel, assistant general manager—operation, has been placed in charge of maintenance and operation of Coal Brook and Olyphant power plants in addition to his existing duties.

H. H. Otto, mining engineer, has been appointed assistant general manager—engineering, in charge of mining, electrical and mechanical engineering work, vice J. F. K. Brown, deceased.

Walter B. Petzold, assistant to mining engineer, has been appointed mining engineer, vice H. H. Otto, transferred.

John M. Reid, colliery superintendent at Olyphant and Eddy Creek collieries, has been appointed general superintendent of mines with headquarters in the Scranton office, reporting direct to Mr. Weichel.

A. J. Wiegand, colliery superintendent at Marvine colliery, has been appointed to a similar post at Olyphant and Eddy Creek collieries, vice John M. Reid, transferred.

Edison Thomas, colliery superintendent at Powderly and Jermyn collieries, has been appointed colliery superintendent at Marvine colliery, vice A. J. Wiegand, transferred.

Leo Healey, colliery superintendent at

Only PAINT Deep

But the Quality Goes Through and Through

The RED-STRAND in "HERCULES" Wire Rope is only paint deep. But what it stands for penetrates through and through, as it represents long experience, diligent research, and advanced manufacturing methods—all of which add up to top-flight service.

In the Preformed type, too, the Red-Strand is always a "red-letter" buying guide. It is easier, quicker and safer to handle. It reduces "breaking-in" time and it lasts longer.

Meet the unprecendented demands of today by specifying "HERCULES" on your purchase order.

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Gibraltar Oil Concentrate, when properly blended with any good grade of motor oil, assures superior engine performance. It is processed from a straight mineral oil base by secret formula and prevents hard carbon from forming on valves and rings. Gibraltar Oil Concentrate penetrates the pores of the metal and gives instant lubrication, reducing overhauls to a minimum.

Friction is reduced by Gibraltar Oil Concentrate as it will withstand high temperatures. Write for details on its recommended use for the following:

DIESEL ENGINES • AIR COMPRESSORS • VACUUM PUMPS
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The Searchlight Section of Coal Age

features Employment, Equipment and Business Opportunities identified with the mining of coal.

"Searchlight" ads are referred to regularly by readers interested in such "Opportunities."

You can therefore bring "Opportunities" you have to offer to the attention of these readers quickly, and at small cost, through an advertisement in the Searchlight Section. (See pages 214-219).

FLEXIPIPE
The improved flexible tubing for mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. With our NEW ROPE SEAM SUSPENSION it can be put up or taken down in a fractional part of the time required by other means of face ventilation.

Write for free sample and full information.

BEMIS BRO. BAG CO.
ST. LOUIS, MO.

Coal Brook colliery, has, in addition to his existing duties at Coal Brook, been placed in charge of Powderly colliery, vice Edison Thomas, transferred.

E. B. Williams, colliery superintendent at Gravity Slope colliery, has, in addition to his duties at Gravity Slope, been placed in charge of Jermyn colliery, vice Mr. Thomas, transferred.

•

Anti-Freeze Treated Anthracite in Demand

Anthracite producers report an increased demand from dealers for coal shipments treated with anti-freeze to facilitate unloading at destination. Substantial tonnages of rock salt have been ordered for this purpose. Experience has proved that rock salt is effective as a soot remover because it lowers the ignition temperature of the soot. Under these conditions, the soot burns more easily when supplied with sufficient oxygen and exposed to the heat of the fire. It is expected that more treated coal will be shipped this year than ever before.

•

Seeks Probe of Natural-Gas Industry

Senator Overton of Louisiana has introduced in Congress a joint resolution directing the Federal Power Commission to inquire into and report to the Congress on the natural-gas industry with a study of the extent and probable life of reserves; utilization of natural gas for domestic, commercial and industrial purposes; extent, character and results of competition with other fuels; present and prospective measures for prevention of waste, and related matters that would be helpful in the administration of the Natural Gas Act or in determining what additional legislation, if any, should be recommended.

•

New River Acquires Stanaford Mines

The New River Co. has purchased Stanaford Nos. 1 and 6 mines from the Koppers Coal Div. The new acquisition is adjacent to a large New River coal reserve in the Beckley seam.

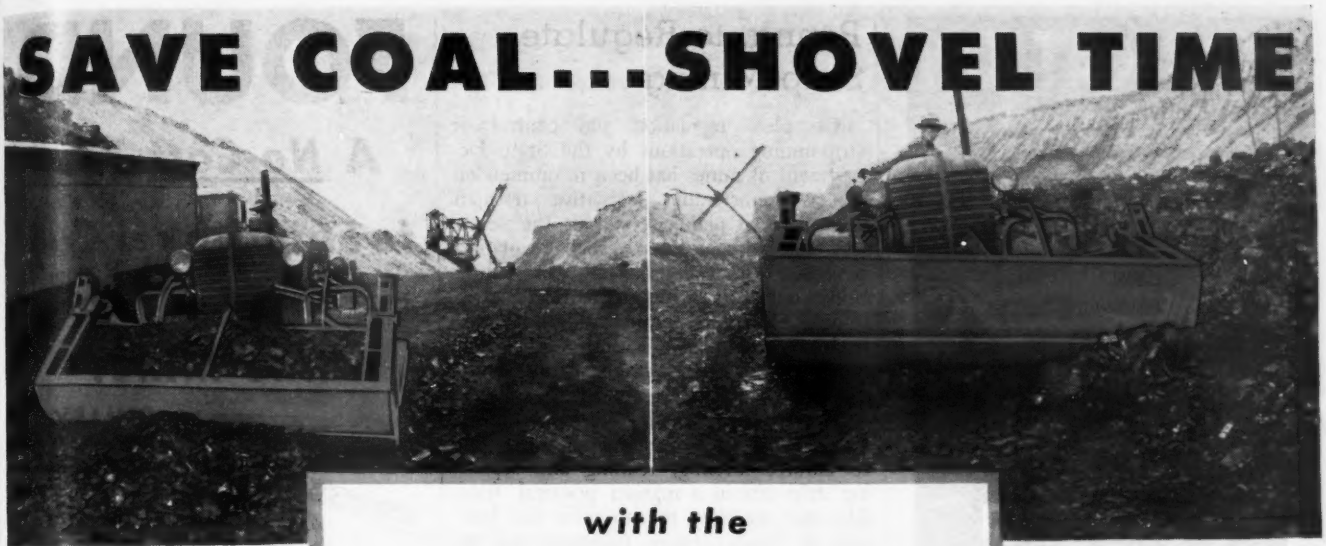
•

Obituary

C. W. Jones Sr., 70, president of the Merrill Coal Co., which he founded at Henlawson, W. Va., in 1941, died Jan. 6 in Logan, W. Va. He had been active in the coal industry for 40 years and was president of the Logan Coal Operators' Association for several years.

Frank P. Williamson, chief draftsman for the Lehigh Valley Coal Co., died Jan. 3 at his home in Wilkes-Barre, Pa., after a long illness. He had been a draftsman for the company for 27 years.

SAVE COAL...SHOVEL TIME



with the

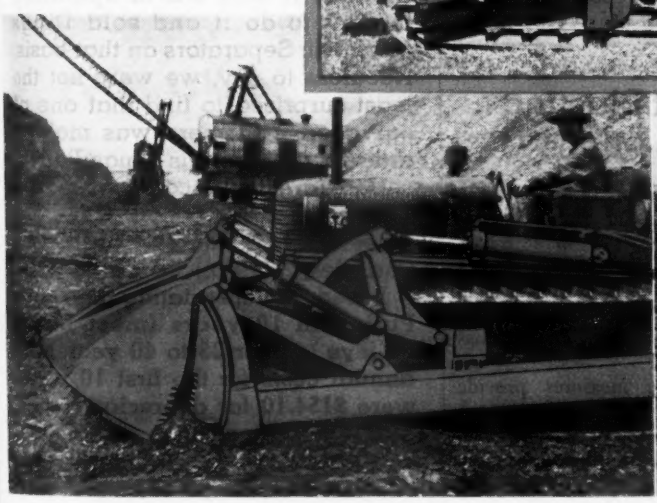
DROTT BULL CLAM SHOVEL

RECLAIMS SPILLED COAL—Saves many tons each day. Picks up coal spillage before trucks destroy it and skids it to shovel for reloading.

CLEANS BEHIND STRIPPING SHOVEL—Gives you cleaner coal. Removes all dirt from coal vein—positive, hydraulic pressure is applied while tractor is in motion.

RECOVERS COAL BEHIND SHOVEL—Picks up loose coal behind shovel—thus speeds up shovel loading by saving clean-up passes.

CONSTRUCTS AND MAINTAINS LEVEES, DAMS, ROADS—This versatile unit handles all operations on construction and maintenance work. Digs, skids and dumps material. Bulldozes, grades!



DROTT BULL CLAM SHOVEL FITS ALL MAKES AND CURRENT MODELS OF CRAWLER-TYPE TRACTORS, from 30 to 130 h. p. Four sizes. 1, 2, 3 and 4 yd. capacities.

Operated by
DROTT POSITIVE, CLOSED HYDRAULIC SYSTEM
SMOOTH • QUICK • DEPENDABLE
Keeps dirt and air out ... keeps oil in! Used successfully on Drott equipment for many years.

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Write For This Book
"STRIP MINING With The DROTT BULL CLAM SHOVEL"
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The "all-out" production of the war period has not only proven the importance of proper lubrication but has effectively demonstrated the superiority of LUBRIPLATE Lubricants. Even the most confirmed skeptic must admit that when two surfaces do not touch, there can be no appreciable wear. The separating film of LUBRIPLATE is tougher. That is why LUBRIPLATE Lubricants impart longer life to shafts, bearings, and gears. LUBRIPLATE has qualities not possessed by conventional lubricants.

LUBRIPLATE

Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. LUBRIPLATE arrests progressive wear.

LUBRIPLATE

Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.

LUBRIPLATE

Lubricants are extremely economical for reason that they possess very long life and "stay-put" properties. A little LUBRIPLATE goes a long way.

Write for a booklet, "The LUBRIPLATE Film", written especially for your industry.

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PISKE BROTHERS REFINING CO.

NEWARK 5, N. J.
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Penna. to Regulate Strip Mining

Complete regulation and control of strip-mining operations by the State Department of mines has been recommended by a Pennsylvania legislative research agency. It is planned to draft the necessary legislation to make such regulation possible. The proposed bill will require mine operators who contemplate strip mining to obtain permits and file bonds to insure compliance with the rules and regulations to be established by the State Secretary of Mines.

Under the requirements of the measure, the Secretary of Mines will be authorized to enforce leveling, refilling and replacing strip pits in a manner practical, feasible and necessary to minimize the hazards of floods, stream pollution and to guard the safety and welfare of the public.

•

Anthracite Output Gains 5.3 Percent

Total commercial production of Pennsylvania anthracite for the calendar year 1944 is estimated at 59,686,000 net tons, of which 60.8 percent was pea size and larger, 14.3 percent No. 1 buckwheat, and the remainder rice and smaller. Compared with 1943, this represents an increase of 3,000,000 net tons, or 5.3 percent. The gain in domestic sizes (pea and larger) was 1,556,500 tons, or 4.5 percent.

•

Would Limit Blasting In Colorado Mines

A bill affecting blasting in coal mines has been introduced in the Colorado State Senate by Senator Ben Veltri, of Trinidad, and Sam T. Taylor, of Walsenburg. A similar measure has been introduced in the House of Representatives by John Horsman and John Johnson, of Las Animas County.

As introduced, the measures provide "the mine foreman shall direct at what hours blasting shall be done in the mine . . . and blasting is prohibited in any mine during the hours when miners are engaged in working in said mine."

•

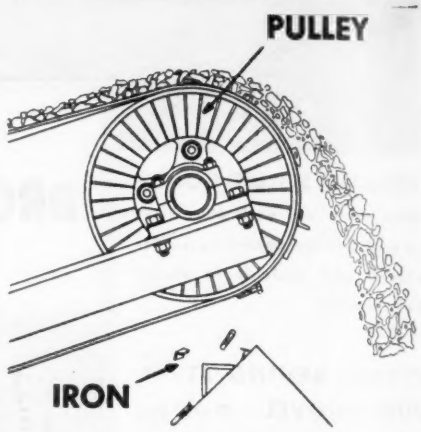
Proposes Rate Cut In Tidewater Case

Reductions in the rates on anthracite to New York Harbor for transshipment have been recommended by Interstate Commerce Commissioner Sharp in a proposed report in the Anthracite Tidewater Case.

Rates involved are from the Wyoming, Lehigh and Schuylkill anthracite producing regions of Pennsylvania to both upper piers and lower piers on the New Jersey shores of New York Harbor, rates to the upper piers now being $2.50 per gross ton on prepared sizes and $2.38 on pea and smaller sizes. Rates to the lower piers

FOUND

A No-Cost Way to Ship Stoker Coal Iron-Free From the Mine!



Most operators recognize the desirability of shipping stoker coal without any iron in it. We always thought it was worth spending money to do it and sold Dings Magnetic Separators on that basis. Needless to say, we were not the least surprised to find that one of our good customers was making a direct profit on his Dings Pulley.

Here are the records based on data from C. B. Scholl, Chief Engineer, Boone County Coal Corp., Sharples, W. Va.:

Based on depreciating the Dings Pulley in 10 years (most Dings Pulleys last for 25 to 40 years) the annual costs for the first 10 years were $154.10 for depreciation and $85.54 for electricity, no maintenance or repairs. This totals $239.64, but the pulley recovered tramp iron that was sold as scrap for $243.00, netting $3.36 per year direct profit. The next 10 years should be "lulus."

It pays to buy the best in magnetic separators. Write to Dings for literature.

Dings Magnetic Separator Co.

506 East Smith Street, Milwaukee 7, Wis.

World's Largest Exclusive Builders of Magnetic Equipment

Dings MAGNETIC SEPARATION HIGH INTENSITY

LOWER PRODUCTION COSTS
with the right type of
HERCULES Permissible

Hercules FAST Permissibles

There are two types of Hercules Permissibles with a high rate of detonation—Collier C and Red H B. Wherever a smashing effect is desired, the Red H B is best suited. Where easier shooting is encountered, the higher count Collier C is oftentimes more economical.

EXPLOSIVE	Approximate No. of 1¼" x 8" cartridges per 100 pounds
Collier C*	320
Red H* B	280

Hercules SLOW Permissibles

There are six Hercules Slow Permissibles, representing a wide range of cartridge strength and count, that are specially suited for coarse coal production. In cases where high cartridge strength is required the three Red H permissibles are suggested. The three Hercoals are widely used for coal that is more easily broken. In many applications Hercoals are replacing black powder and are giving highly satisfactory results.

EXPLOSIVE	Approximate No. of 1¼" x 8" cartridges per 100 pounds
Hercoal* F-1	500
Hercoal* D	450
Hercoal* C-1	400
Red H* F	356
Red H* D	316
Red H* C	276

Hercules GELATIN AND SEMI-GELATIN Permissibles

Both Hercogel A and Hercogel 2 are designed primarily for use under wet conditions. Hercogel A is a true gelatin permissible, and is highly water-resistant. Hercogel 2 is a semi-gelatin permissible that is more economical and perfectly satisfactory for most ordinary water conditions.

EXPLOSIVE	Approximate No. of 1¼" x 8" cartridges per 100 pounds
Hercogel* A (Gelatin)	200
Hercogel* 2 (Semi-gelatin)	240

*Reg. U. S. Pat. Off.

XP-51

EXPLOSIVES DEPARTMENT

HERCULES POWDER COMPANY

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934 KING STREET, WILMINGTON 99, DELAWARE

MERRICK WEIGHTOMETER

While material is smoothly moving along a conveyor, the MERRICK WEIGHTOMETER keeps a continuous and accurate record of weights. Total weight is available at a glance.

Applied to any size belt conveyor, either horizontal or inclined. The weightometer gives a simplified and dependable record of your production, with out interrupting the flow of coal.

Write for Bulletin 375

MERRICK SCALE MFG. CO.

PASSAIC, N. J.

are 5c. lower than those to the upper piers. The examiner finds these rates unreasonable and recommends as reasonable rates for the future: $2.10 on prepared sizes and $1.98 on pea and smaller to the upper piers, and 5c. less to the lower piers, representing a general reduction of 40c. per gross ton.

•

Coal Mine Fatalities Rise Slightly in Rate

Accidents at coal mines of the United States caused the deaths of 78 bituminous and 13 anthracite miners in November last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 50,215,000 net tons, the accident death rate among bituminous miners in November last was 1.55 per million tons, compared with 1.48 in the preceding month and 1.70 in November, 1943.

The anthracite fatality rate from accidents in November last was 2.56, based on an output of 5,073,000 tons, against 1.97 in the preceding month and 5.66 in the eleventh month of 1943.

For the two industries combined, the accident fatality rate in November last was 1.65, compared with 1.52 in the preceding month and 2.03 a year earlier.

Fatalities during November last, by causes and states, as well as comparable rates for the first eleven months of 1943 and 1944, were as follows:

QUALITY MARLO PACKING

•

METALLIC & SEMI-METALLIC

PACKING

for

MINE PUMPS

"The Packing that gets the Repeat Orders"

For deep mine pumps. Resists acid mine waters. Keeps grit out of stuffing box. Three types.

• **MARLO ALL PURPOSE METALLIC PACKING**

Best ever devised. Will not freeze at 70° below. Soft, pliant, like fibrous types, yet easier to handle. Won't cut, score or corrode moving parts.

• **"TWIN-TWIST" SEMI-METALLIC PACKING**

Metal strands twisted with asbestos. Anti-frictional. Durable. Economical. Remarkable compressibility. Never hardens. For temperature up to 550° F.

• **"RED WATER" SEMI-METALLIC PACKING**

Most modern development for all hydraulic applications. A solid-packing vegetable fibre combined with metal strands. Retains form under any conditions.

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FOR SAFETY'S SAKE, SUPERIOR COUPLINGS

Drop Forged Links

Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

DROP FORGED SWIVEL COUPLINGS

PITTSBURGH KNIFE & FORGE CO.

1421 Reedsdale St., N.S.
Pittsburgh 12, Pa.

U. S. COAL-MINE FATALITIES IN NOVEMBER, 1944, BY CAUSES AND STATES

State	Underground: Falls of Roof	Falls of face	Haulage	Explosives	Electricity	Machinery	Mine Fires	Other Causes	Total Underground	Open-cut	Surface	Grand Total
Alabama	2	..	2	..	..	..	..	..	4	..	..	4
Colorado	2	..	..	..	..	..	1	..	3	..	..	3
Illinois	3	..	..	..	2	..	..	..	5	..	..	5
Indiana	..	..	2	..	1	..	..	..	3	..	..	3
Kentucky	10	..	2	1	..	1	..	..	14	..	..	14
Michigan	1	..	..	..	..	..	..	..	1	..	..	1
Missouri	..	1	..	..	..	..	..	..	1	1	..	2
New Mexico	1	..	..	..	..	..	..	..	1	..	..	1
North Dakota	1	..	..	..	..	1	..	..	2	..	..	2
Ohio	..	..	1	..	..	..	..	..	1	..	..	1
Penna. (bituminous)	6	..	3	..	..	2	..	..	11	1	1	13
Virginia	2	..	1	..	..	..	..	..	3	..	..	3
Washington	..	..	..	..	..	..	..	..	..	..	1	1
West Virginia	13	1	6	..	..	2	..	..	22	..	2	24
Wyoming	1	..	..	..	..	..	..	..	1	..	..	1
Total bituminous	42	2	17	1	3	6	1	..	72	2	4	78
Penna. (anthracite)	5	..	2	1	..	..	..	3	11	..	2	13
Grand total	47	2	19	2	3	6	1	3	83	2	6	91

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*

January-November, 1943 and 1944

Cause	Bituminous: Number Killed		Killed per Million Tons		Anthracite: Number Killed		Killed per Million Tons		Total: Number Killed		Killed per Million Tons	
	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944
Underground:												
Falls of roof and coal	587	508	1.097	0.885	111	72	2.033	1.203	698	580	1.184	0.915
Haulage	219	202	.409	.352	37	20	.678	.334	256	222	.434	.350
Gas or dust explosions:												
Local	26	8	.049	.014	1	2	.018	.033	27	10	.046	.016
Major	148	22	.277	.038	14	...	.257	....	162	22	.275	.035
Explosives	27	15	.050	.026	9	16	.165	.267	36	31	.061	.049
Electricity	32	30	.060	.052	1	3	.018	.050	33	33	.056	.052
Machinery	25	33	.047	.058	1	...	.018	....	26	33	.044	.052
Shaft	7	4	.015	.007	1	5	.018	.084	8	9	.014	.014
Miscellaneous	25	91	.047	.159	10	16	.183	.267	35	107	.059	.169
Stripping or open-cut	21	26	.039	.045	10	7	.183	.117	31	33	.053	.052
Surface	51	44	.095	.077	20	11	.366	.184	71	55	.120	.087
Total	1,168	983	2.183	1.713	215	152	3.937	2.539	1,383	1,135	2.346	1.791

* All figures subject to revision.

Mining Problems are Solved by Brown-Fayro EQUIPMENT

Cut Mine Drainage Costs

Gathering Pumps—if they're Brown-Fayro—offer savings in drainage costs. Austin Brownie Perfect Oiler Pumps are built in ratings of 30 to 100 GPM against heads up to 250 ft., with cylinders to handle any kind of mine water. The 6x6 V-belt driven pump is illustrated.

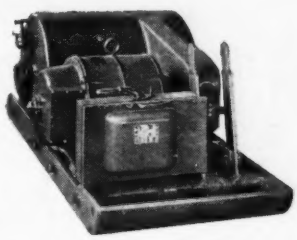
Cut Post Pulling Costs

Save post-pulling costs with this new Post Puller that has been developed to recover props and headers in worked-out sections of coal mines. The timbers which are recovered can be used again, affecting considerable saving in operating costs.

Cut Car Spotting Costs

Costs can be reduced by using the type of hoist best suited to your conditions. Cars are accurately placed at loading points, production is not lost when changing trips, and maintenance costs are low.

Cut Equipment Moving Costs



Use a portable hoist to move conveyor parts and equipment. Operators using HGD rigging hoist for this purpose report the man hours needed to move a conveyor unit amount to only 40% of the time required by former methods.

Here's Why:

Brown-Fayro has a long line of mine equipment — in many sizes and models — designed to lessen your mine jobs and save you time and materials.

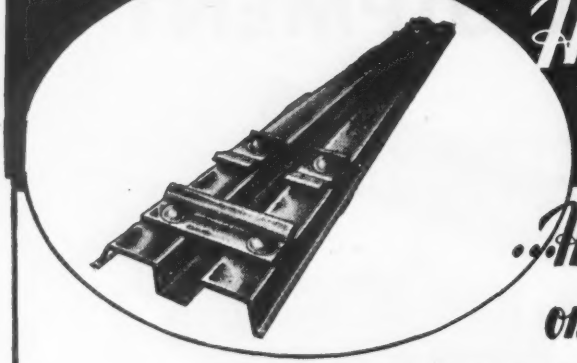
Engineers at Brown-Fayro for years have specialized in mine equipment. They are familiar with the unusual requirements of the mining industry, and this background of experience enters into the design of all Brown-Fayro products.

You get real savings — plus *increased* production — when you specify Brown-Fayro equipment. If you are not familiar with all of the Brown-Fayro products, write today for leaflets on the illustrated machines, or on mine cars, layer loading hoists, tubing blowers, room hoists, car retarders, sheaves and rollers, rerailers and derailers.

THE BROWN-FAYRO COMPANY

JOHNSTOWN, PENNA.

Coal Production Depends on Haulage...



...Haulage depends on Good Track!

TIE FACTS TO TIE TO

The size of rail used does not necessarily determine the size of tie to be used. It is the severity of the service that indicates the weight of tie that will best serve the purpose. Whatever the size required, we have them.

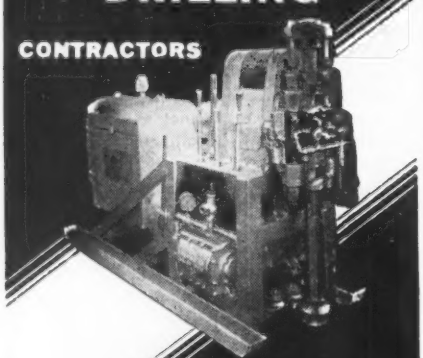
Tie weights per foot 1¼#; 2½#; 3¼#; 4#; 5# and 6#.

All furnished with the following special features:

Rotary clips are self locking
Square shoulders on fixed clips hold rolls to exact gage
Are compact and easily portable
May be used over and over many times
They are protected by a heavy coat of hot applied rust resisting paint
They are easily installed—just hammer the clips

WEST VIRGINIA STEEL & MFG. COMPANY
Formerly The West Virginia Rail Company
HUNTINGTON (1) WEST VIRGINIA

MOTT
DIAMOND CORE DRILLING
CONTRACTORS

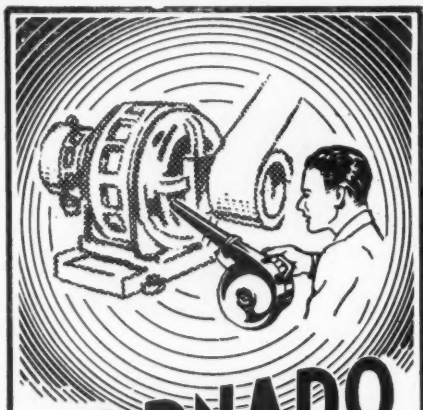


Mott Type "A" Oil Hydraulic 1500 Ft. Cap., 2¼" Diameter Core.

● Coal and all mineral properties tested—using our light gasoline drills. They save fuel and moving costs . . . guarantee satisfactory and proper cores.

Pre-pressure grouting for mine shafts. ground solidification for wet mine areas by our stop grout method. Water wells and discharge holes drilled and grouted . . . electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA



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PORTABLE ELECTRIC BLOWER
reduces
DUST DANGER

BLOWS clean, dry air, at 295 m.p.h. Cleans out motors, generators and hard-to-get-at places—removing dust, dirt, lint and chips. Costs less than 3c an hour to operate. Reduces damage to motors and bearings—lessens fire and health hazards.

1 H.P. universal G.E. motor. Weight, 14 lbs. Portable to any place in plant. Plugs in at convenient outlets. Adaptable as Sprayer for spraying paint and insecticide. Convertible into powerful industrial Vacuum Cleaner—for cleaning floors, walls, ceilings, etc.

Free Trial—Write to
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5098 N. Ravenswood Ave., Chicago 40

TAKE THE DUST OUT OF DUST IN INDUSTRY
TORNADO

Coal Publications

Moose Creek District of Matanuska Coal Fields, by G. A. Apell, U. S. Bureau of Mines* R. I. 3784, 50 pp., 8x10½ in.; paper; mimeograph. About 1,656,700 tons of good grade recoverable high-volatile B bituminous coal reserves have been found. Unrecoverable coal totals 718,800 tons.

Filter-Paper Method for Obtaining Dust Concentration Results Comparable to Impinger Results by C. E. Brown, U. S. Bureau of Mines.* R. I. 3788, 30 pp., 8x10½ in.; paper; monograph; free. As the filter paper is dry there is no bacterial growth or solution of the dust, which is removed for counting by ethyl alcohol or other liquids.

Successful Method for Signaling From Mine Cages at Rest or in Motion, by Carl Belser, U. S. Bureau of Mines.* I. C. 7305, 20 pp., 8x10½ in.; paper; mimeograph; free. Two mine-cage signaling systems at Park Utah Consolidated Mines shaft are described. A severe accident or a single fatality avoided by a signal from the cage might save in compensation more than the cost of the system described.

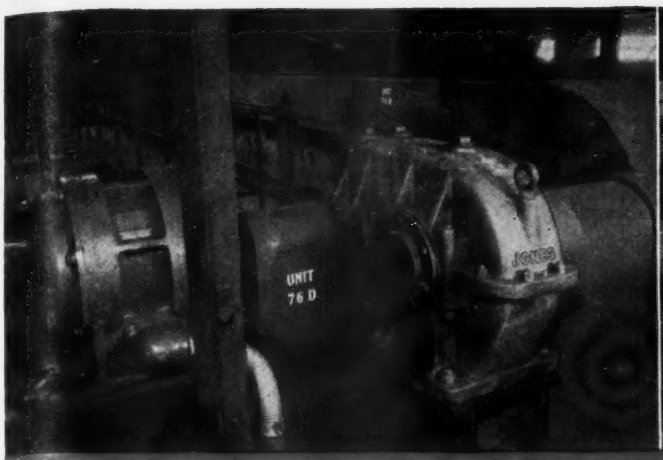
Calorimetric Determination of Low Concentrations of Carbon Monoxide by the Use of a Palladium Chloride-Phosphomolybdic Acid-Acetone Reagent, by H. H. Schrenk, L. B. Berger and B. D. Polis.* R. I. 3785, 8x10½ in., paper; mimeograph; free. Reagent is sensitive to less than 0.01 percent of carbon monoxide in air and in certain other gas mixtures and needs only 50 c.c. of air sample. "Molybdenum blue" is formed when carbon monoxide reacts with an acid solution.

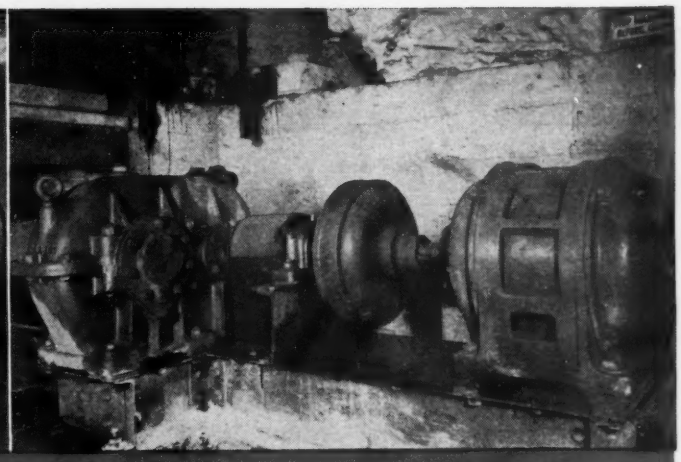
Prevention of Benzene-Air Explosions by Addition of Nitrogen and Carbon Dioxide, by G. W. Jones, U. S. Bureau of Mines.* R. I. 3787, 8x10½ in., paper; mimeograph; free. In this report are flammability tables for: (1) mixtures of (a) hydrogen and nitrogen, (b) carbon-monoxide and nitrogen, (c) carbon monoxide and carbon dioxide, (d) methane and nitrogen, (e) methane and carbon dioxide, (f) ethylene and nitrogen, and (g) ethylene and carbon dioxide; (2) coke-oven gas, (3) coal gas, (4) carbureted water gas, (5) natural gas mixed with water gas, (6) oil gas, (7) water gas, (8) producer gas, and (9) blast furnace gas.

Some of the Hazards of Auxiliary Fans in Coal Mines, by D. Harrington and R. G. Warncke, U S Bureau of Mines.* I. C. 7298; 27 pp., 8x10½ in.; paper; mimeograph; free. Specifies 15 hazardous conditions and gives instances illustrating each hazard with actual occurrences.

Low-Temperature Carbonization of Alaska Coals, by W. H. Selvig, W. H. Ode and J. D. Davis, U. S. Bureau of Mines.† T. P. 668, 16 pp., 5⅞x9½ in., paper. Price, 10c. Both Suntrana and Puritan coals give low yields of carbonization products, a characteristic of subbituminous coals.

* Apply U. S. Bureau of Mines.
† Apply Superintendent of Documents.

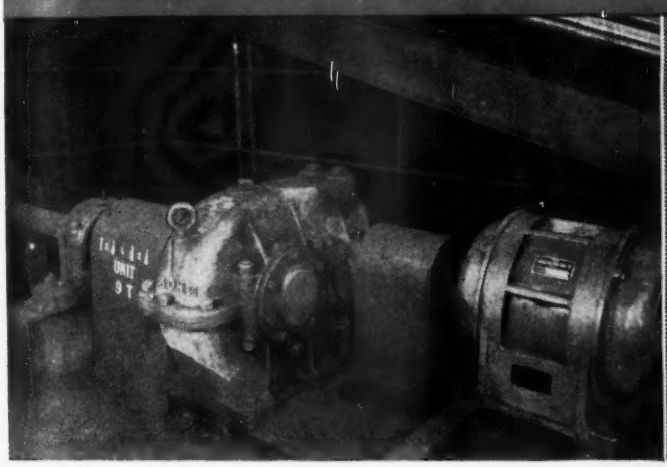




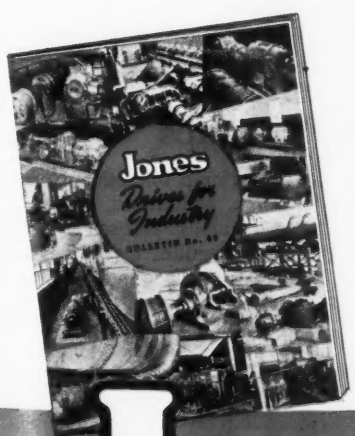
• Jones herringbone reducer driving a raw coal flight conveyor to the vibrators at the new Jenkins, Ky. preparation plant of the Consolidation Coal Co.

• For driving the conveyor to the stoker blending hopper a Jones 20.8:1 herringbone speed reducer is used.

• Each trip maker is protected from shock by a hydraulic coupling which is located between the motor and the Jones herringbone speed reducer.



JONES DRIVES help speed the wartime fuel supply



THE problem of greater coal production with a constantly dwindling man power supply calls for the most careful scrutiny of every detail of operating procedure. Thus the drives for belt and scraper conveyors, bucket elevators, feeders, railroad car dumps, loading booms, skip hoists and similar services can't just be taken for granted in wartime. Drives must be selected that will stand up under the severe punishment of present day production schedules.

Jones Drives for the coal industry have measured up in every way to this standard. That is why, on property after property, Jones speed reducers and other transmission products have again and again been selected for each expansion program.

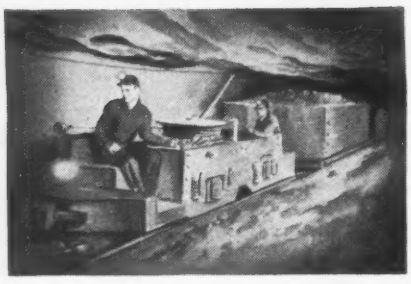
The illustrations shown here are of drives located at the new Consolidation Coal Company's preparation plant at Jenkins, Kentucky. In this plant some 25 Jones herringbone speed reducers are now in service.

If you would like to have a condensed picture of the Jones products and engineering service, that are being widely used by the coal industry, just ask for Bulletin No. 80, "Jones Drives for Industry".

Jones

HERRINGBONE—WORM—SPUR—GEAR SPEED REDUCERS • PULLEYS
CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES • ANTI-FRICTION
PILLOW BLOCKS • FRICTION CLUTCHES • TRANSMISSION APPLIANCES

W. A. JONES FOUNDRY & MACHINE CO.
4401 Roosevelt Road, Chicago, Ill.



Equipment News

Lubricant Pump

Farval Corp., Cleveland, Ohio, offers automatic central pumping unit DC-25, a small-size double-plunger slide-valve type said to provide a positive high-pressure pump handling all types of lubricants without the use of springs, check valves or stuffing boxes.

Handling either oil or grease and said to require no attention except renewal of the lubricant supply in the reservoir, the DC-25 delivers lubricant under pressure to all bearings in the system through two main supply lines serving a Farval Dualine measuring valve at each bearing. Frequency of operation is controlled by an electric time clock. A suitable signal device is available to indicate any interruption to normal operation of the system.

•

Bearing

Dodge Mfg. Corp., Mishawaska, Ind., offers a new Dodge-Timken bearing known as Type E, now available in both pillow blocks and flanged units. On each end of the extended inner race is a steel collar having two headless setscrews spaced 120 deg. apart and extending through clearance holes in the inner race to the shaft for fastening. These four setscrews provide a positive lock to prevent rotation of the inner race on the shaft.

Housings are compact and strong and are precision machined to close tolerances on automatic machines. Simple labyrinth seals prevent loss of lubricant and protect bearings against damage from dust, dirt or moisture.

•

Face Shield

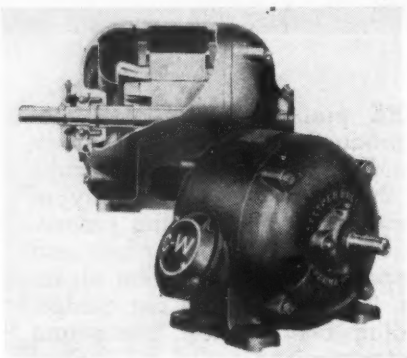
A new face shield offered by the Chicago Eye Shield Co., 2300 Warren Blvd., Chicago 12, Ill., features easy, quick visor replacement. The visor, said to be of tough, non-inflammable plastacele to protect the head and neck, fits snugly against the chest to prevent the entrance of flying particles from below. The face shield, of snap-fast design, replaceable, it is asserted, in 15 seconds, has form-fitting headgear with soft leather sweatband.

•

Protected Type Motor

A new motor, said to combine the surplus capacity of the conventional open motor with protection against dripping liquid, falling metal chips and other foreign matter, has been developed by the Crocker-Wheeler Division of Joshua Hendy Iron Works, Ampere, N. J.

Rated 40 C rise, full-load continuous duty, with a 15 percent service factor, these motors are available now in sizes up to the 284 frame. There are no openings in the frame or shields above the horizontal center line. This, together with



the shielded construction of the ventilating openings, says the manufacturer, makes protected-type motors suitable for machine tool and similar applications where other types of inclosures have been required in the past.

•

Wire Stripper

An inexpensive wire stripper for cleaning cotton and enamel, silk and enamel, string asbestos and similar types of light insulation is offered by the Ideal Commutator Dresser Co., 1013 Park Ave., Sycamore, Ill. Round, flat or rectangular wire—solid or stranded, any length—may be stripped, it is said.

The two wire cleaning brushes are positively driven, being mounted directly on the end of separate motor shafts; the right-hand motor is mounted on a pivoted base and is normally held up by a spring. To strip wire, simply insert the wire in the opening and press the foot pedal. The strippings, dust and dirt are removed by a dust collector, driven by a separate motor, having a dust capacity of 1 cu.ft. per minute and rated at 60 cu.ft. of air per minute at 0.55 in. static pressure.

•

Car-Thawing Outfits

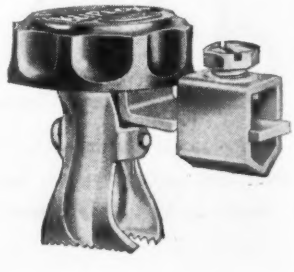
Coal and railroad-car shortages, it is said, can be alleviated to some extent by quicker deliveries of available coal through the use of light kerosene-oil-burning thawing outfits designed by the Aeroil Burner Co., Inc., West New York, N. J., which asserts they will empty frozen cars of coal four times as fast and with 75 to 80 percent less manpower than by other known methods.

The Aeroil equipment uses 94 percent air pressure from a pressure tank and but 6 percent of white oil kerosene. It is said to be handled easily by one man to empty completely frozen cars in 100 minutes, tested time. These outfits come in several sizes of torches, upright burners and air-pressure tanks—5-, 15- and 20-gal.

•

Test Clamps

A new test clamp line offered by Trico Fuse Mfg. Co., Milwaukee, Wis., said to employ tremendous jack-screw gripping action, is recommended for making heavy-duty temporary connections; motor and meter testing, jumpers, cable and busbar taps, battery charging, welding and many other shop and laboratory purposes. Solderless lugs, it is said, provide perfect and quick electrical connections without the use of special tools or cutting into wire; arranged to swivel around clamp, permit-



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J&L PERMASET PRECISIONBILT PRE-FORMED WIRE ROPE

J&L PERMASET WIRE ROPE

Precisionbilt for Longer Wear and Lower Operating Costs . . . J&L Wire Rope for mining operations of all kinds is Precisionbilt to stand the severe abrasive conditions encountered and the speed to which cables are subjected. Made from J&L Controlled Quality Steel . . . by men of skill and experience . . . on machines of latest design . . . J&L Precisionbilt Wire Rope affords you extra safety . . . longer wear . . . lower operating costs.

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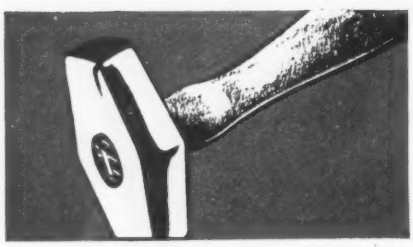

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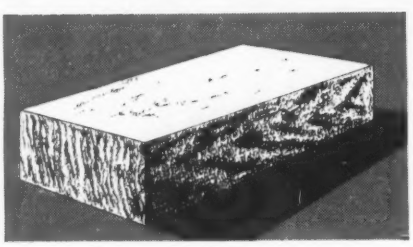

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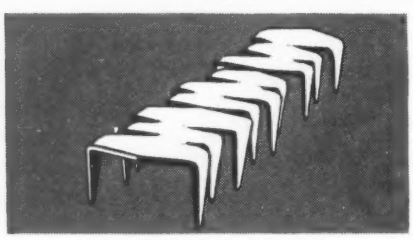

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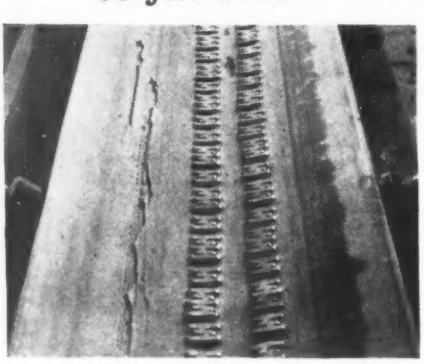

BRISTOL'S BELT LACING

For rubber or woven conveyor belts up to $13/16$" thick.
Write for Bulletin 736.

THE BRISTOL COMPANY
Mill Supply Division
139 Bristol Road, Waterbury 91, Conn.
DISTRIBUTORS EVERYWHERE

ting wires and cables to hang in a natural position after installation. Available in six sizes to fit across ferrule and knife-blade fuse clips, switch blades, round or flat busbars, cables, etc. Bulletin 7 contains detailed description.

•

Battery Charger

A single-unit charger for its recently introduced rechargeable wet flashlight storage battery which can be operated from the ignition system of automobiles, trucks, buses, tractors, boats or airplanes is offered by B. F. Goodrich Co., Akron, Ohio. Designed for easy attachment on the dash, cowl, side panel or several other convenient places on the vehicles, the charger may be connected so that it does its work with the vehicle either running or idle. For charging while the vehicle is not in use it is attached to the "live" side of the ignition system. It operates on 6 volts and 12 volts, d.c.

•

High-Speed Diesels

Cummins Engine Co., Inc., Columbus, Ind., offers Series NH-600 and NHS-600 diesel engines, which are higher speed and higher horsepower versions of the Model H and Model HS. Improvements in design have produced, it is said, 33⅓ percent additional horsepower in the Model NH over the Model H and 37½ percent in the supercharged NHS over the supercharged Model HS. Manufacture of all existing models will be continued.

•

Industrial Notes

General Electric Co., Schenectady, N. Y., announces that E. D. Spicer, formerly vice president responsible for apparatus manufacturing, is now a member of the president's staff, with headquarters in New York. He is in charge of employee relations and also is consultant on general manufacturing matters. William R. Burrows, a vice president since 1927 and chairman of the labor relations committee, retired Dec. 31. The apparatus operating committee was discontinued at the end of the year, and Roy C. Muir, formerly a vice president of the executive staff, has relinquished his special duties to become general manager of the apparatus department. Earl O. Shreve, vice president and chairman of the apparatus operating committee, with responsibility for all apparatus sales, has relinquished these duties to become a member of the president's staff in charge of customer relations. His headquarters will be in New York. H. V. Erben, commercial vice president and manager of the central station divisions, has been named assistant general manager of the apparatus department; C. H. Lang, vice president, is manager of sales; H. A. Winne, vice president, is manager of engineering; Neil Currie Jr. is manager of manufacturing; Guy S. Hyatt, assistant comptroller, is in charge of accounting,

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when and where NEEDED MOST

Each Hodgman garment is designed for a specific use or occupation to stand up under the most severe service conditions. All fabrics, coated in our own plant, meet the most rigid government specifications. All Hodgman garments are reinforced in the proper places, are waterproof and provide the utmost in comfort. There is a Hodgman garment for almost every industrial use.

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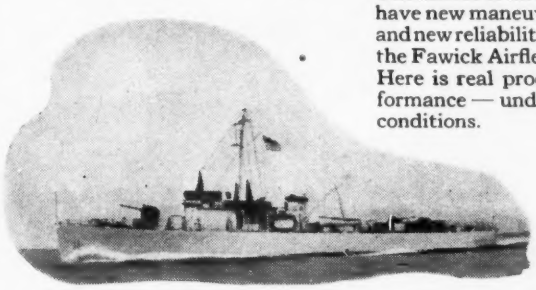
New York 6, 261 Fifth Ave. | Chicago 2, 173 W. Madison | San Francisco 5, 121 Second

We're Looking for

Clutch Trouble



Thousands of naval vessels have new maneuverability and new reliability through the Fawick Airflex Clutch. Here is real proof of performance — under battle conditions.

Now you can equip your heavy duty machines with a clutch that is proof against trouble.

The Fawick Airflex Clutch controls torque by air. Actually, it gives you air-cushioned power. It absorbs shock and vibration, with a clutch grip as firm, or as light, as the job requires.

This revolutionary new clutch needs no arms, levers or springs. It requires no adjustments, no lubrication. It corrects automatically for misalignment. Maintenance costs are unusually low.

The Fawick Airflex Clutch has proved itself in heavy duty service—for Diesel drives, marine and industrial, presses, rubber, paper and steel mills, hoists, draglines, cranes and shovels—wherever the going is tough.

Write us for engineering recommendations based on broad clutch experience.

FAWICK AIRFLEX COMPANY, INC.
9919 Clinton Rd. • Cleveland 11, Ohio

In Canada, **Renold-Coventry Ltd., Montreal, Toronto, Vancouver**

In Britain, **Crofts Engineers, Ltd., Bradford, England**

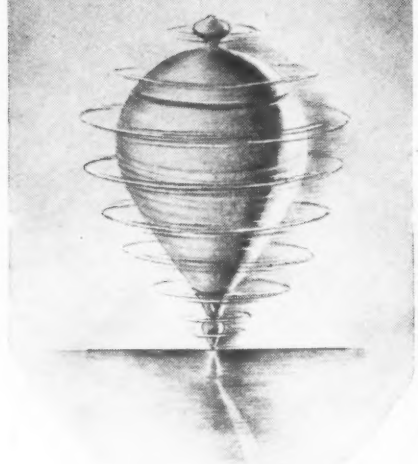
12 Important Advantages

1. **Simple in design and operation**
2. **Flexible control by air**
3. **No adjustments or oiling — low maintenance**
4. **Dampens vibration—absorbs shocks**
5. **Corrects misalignment automatically**
6. **Smooth starting—no jerks**
7. **Runs cooler—uniform pressure**
8. **Controls torque by air pressure**
9. **Greater capacity—more compact**
10. **Remote control by air valve**
11. **Replaces flexible couplings**
12. **Acts as clutch, slip-clutch, brake and coupling**

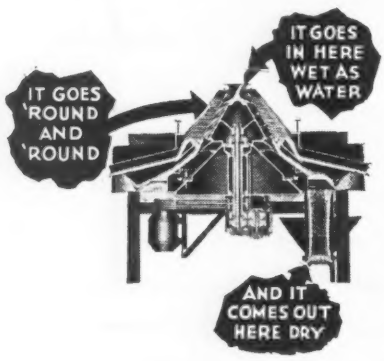
FAWICK *Airflex* CLUTCH

POWER CONTROLLED BY AIR

The "C·M·I" CONTINUOUS CENTRIFUGAL



FOR the most economical and simple method for dewatering and drying the smaller coal sizes. The many installations in modern coal washing plants are proof of this. We shall be glad to give you the details of the installations.



Sludge and slurry coals are also being reclaimed by using this machine. Where a large part of the ash is in the finest sizes, ash content as well as the water content is reduced.

Centrifugal and

Mechanical Industries,
INC.
3600 South Second Street
St. Louis 18, Mo.

and W. W. Jenkins, of the law department, is counsel.

PORTABLE PRODUCTS CORP., Pittsburgh, Pa., has purchased the assets, including goodwill, name and patents, of the C. J. Tagliabue Mfg. Co., manufacturer of industrial control and laboratory instruments, Brooklyn.

CUMMINS ENGINE CO., INC., Columbus, Ind., has appointed F. W. Sparks as manager of its Cleveland region (including Ohio and Michigan), with headquarters at 805 Fidelity Building, Cleveland 14.

BUFFALO FORGE CO., Buffalo, N. Y., has appointed N. R. Johnson as factory manager after 28 years with the company, many of them as general purchasing agent. H. D. Hebard has been named director of purchases after 24 years' service, mostly in sales work but lately as assistant to Mr. Johnson.

PHILCO CORP., Philadelphia, announces that Edward F. Theis, who until 1942 was closely associated with the company's refrigerator division, has been elected vice president in charge of refrigerator production.

EDWIN H. ANDERSON has opened an office at 201 Lewis Arcade Building, Huntington, W. Va., where he will be distributor for the Quaker Rubber Corp. He represented the Goodyear Tire & Rubber Co. for ten years in West Virginia, working out of Charleston the last 3½ years, and also represented U. S. Rubber for a time.

J. A. WILLIAMS CO., Pittsburgh, Pa., wholesale hardware distributor, has appointed Lou Braden as director of sales. Recently he has been general manager and director of sales for the Logan Gregg Hardware Co.

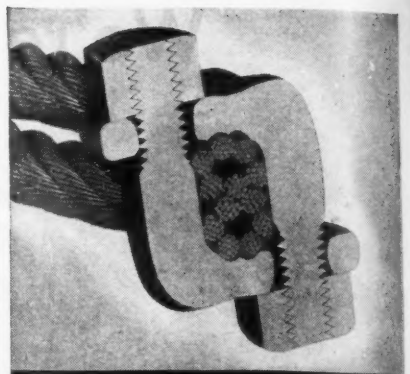
WICKWIRE SPENCER STEEL CO., 500 Fifth Ave., New York 18, N. Y., has appointed H. C. Allington as assistant general sales manager.

R. G. LETOURNEAU, Peoria, Ill., has promoted Cloyd W. Richards to assistant service manager and Sam E. Beebe to manager of service engineers.

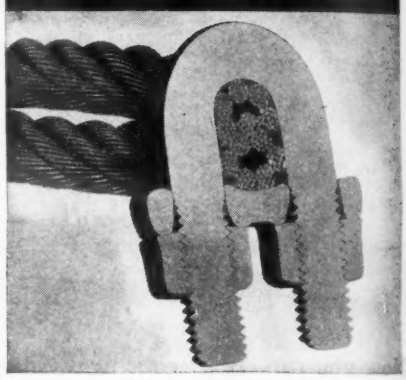
LAKE SHORE ENGINEERING CO., Iron Mountain, Mich., has opened new sales offices in the Union Commerce Building, Cleveland 14, Ohio, J. M. Record will be district manager for lake shore in the Cleveland territory.

WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J., has elected Clarence E. Searle as president to succeed Harry C. Beaver, who has been elected vice chairman of the board of directors and chairman of the management committee. Hobart C. Ramsey, vice president in charge of operations, has been elected executive vice president. Edwin J. Schwanhausser, vice president in charge of manufacturing and sales operations in Buffalo, has been elected vice president in charge of sales. Leslie C. Ricketts, manager of the Harrison works, has been elected a vice president.

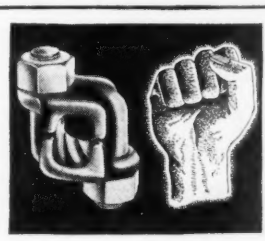
STEWART-WARNER CORP., Chicago, has named Arden LeFevre as vice president and director of engineering of Division 1 (Alemite, instruments and radio);



WHICH WAY TO FASTEN PREFORMED WIRE ROPE?



The cross-section views show what happens to wire rope. In Fig. 1, Laughlin's "Fist-Grip" Safety Clip holds the 5/8" rope with hardly any distortion (note hemp centers). In Fig. 2, hemp center under U shows how rope is squeezed and flattened by U-bolt's smaller bearing area and "Finger-Pinch". Both were tightened to same tension by torque-indicating wrench.



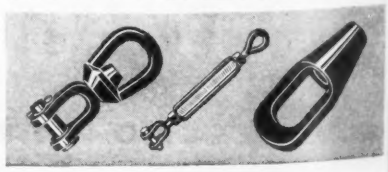
Here's Why "Fist-Grip" Clips Work Better

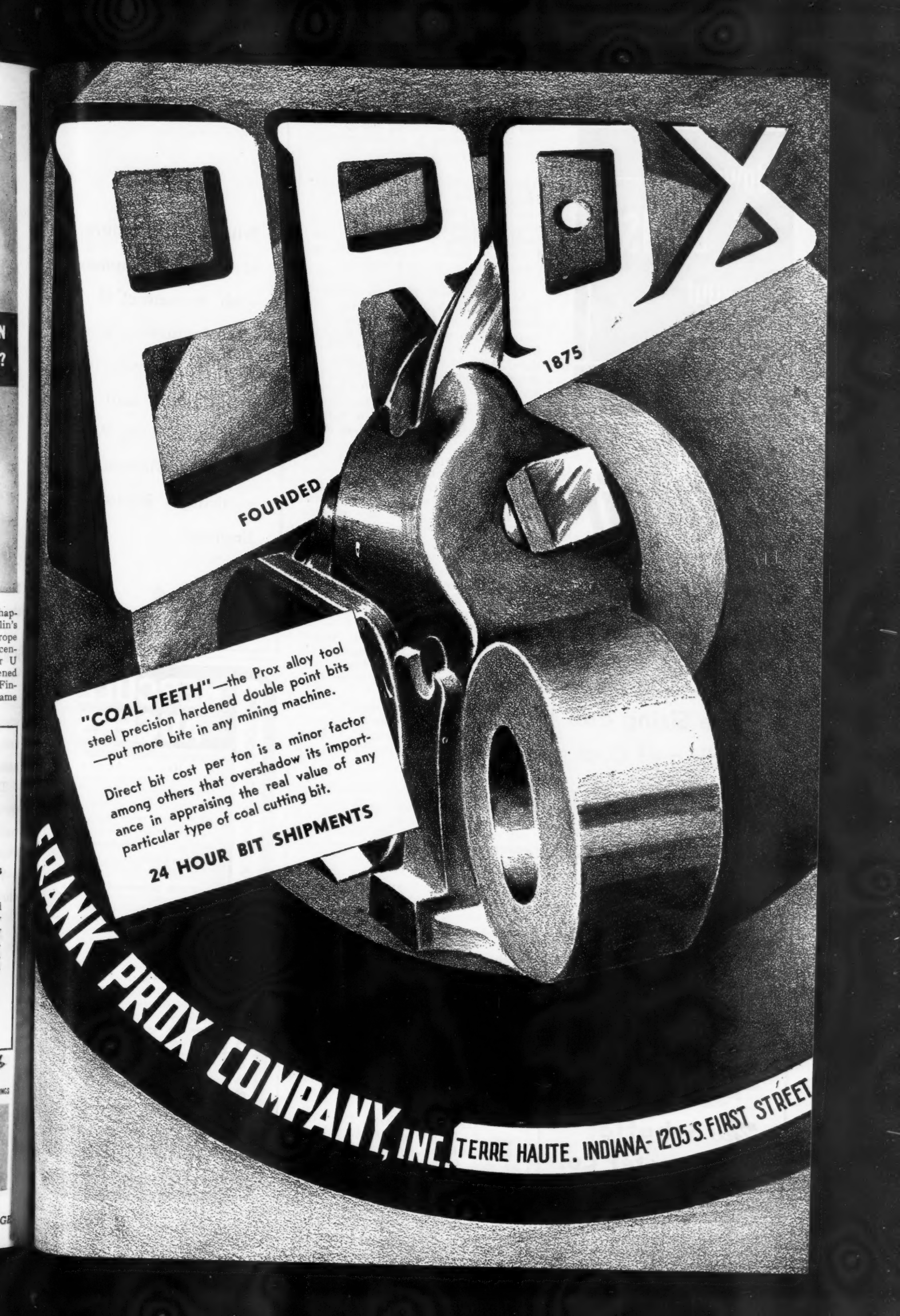
Laughlin Safety Clips have identical saddles, flat sides; hold rope firmly without crushing. Saddles fit snugly against "live" and "dead" ends. Fewer clips deliver full rope power. The only clips with drop-forged bolts. Test them, for your rope's sake.

Distributed through mill, mine and oil field supply houses. Write for catalog. Dept. 6, The Thomas Laughlin Co., Portland 6, Maine.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

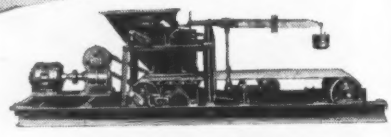



PROX
FOUNDED
1875
"COAL TEETH"—the Prox alloy tool steel precision hardened double point bits —put more bite in any mining machine.
Direct bit cost per ton is a minor factor among others that overshadow its importance in appraising the real value of any particular type of coal cutting bit.
24 HOUR BIT SHIPMENTS
FRANK PROX COMPANY, INC.
TERRE HAUTE. INDIANA- 1205 S. FIRST STREET

downtown
ST. LOUIS
at your
doorstep

HOTEL
Mayfair

Handle Sizing and Blending of Coal
Automatically
with the



SCHAFFER
POIDOMETER

The SCHAFFER Poidometer automatically proportions, weighs and conveys crushed, granulated, and pulverized coal . . . according to the weights and proportions you want! These units can be used singly or in batteries . . . in pulley centers up to 35' 0", thus eliminating extra conveyors and expense. Our Catalog #8 explains the Poidometer in detail. Write for your copy today.

The Schaffer
Poidometer Co.
2828 Smallman St.
Pittsburgh 22 Pennsylvania

Fred R. Cross as advertising manager, and George W. Oehlsen Jr. as assistant director of engineering, Division 1.

Jones & Laughlin Steel Corp. has purchased from Talon, Inc., its electric welded tube plant at Oil City, Pa. The new acquisition will be known as the Electric Welded Tube Division of Jones & Laughlin Steel Corp. and will be operated with the present personnel.

An arrangement has been concluded whereby Wm. Neill & Son, Ltd., St. Helen's Junction, Lancashire, England, is licensed to manufacture and sell in Great Britain and Europe the Myers-Whaley shoveling machines and Whaley Automat shoveling and loading machines. The British concern will have the full cooperation of the Myers-Whaley Co., Knoxville, Tenn., in the production and application of these machines in those areas.

Air Reduction Sales Co., 60 East 42d St., New York 17, N. Y., has made the following appointments: H. F. Henriques, formerly sales manager, north central division, made general sales manager; J. J. Lincoln, formerly sales manager, south central division, appointed director of sales services; C. M. Bloodgood, who has been serving as sales manager, Pacific Coast division, named assistant to the vice president in charge of sales. All of the preceding will have headquarters in the New York office. H. P. Etter, heretofore manager of the Los Angeles district, was named sales manager of the Pacific Coast division, with headquarters in Mills Tower Building, San Francisco.

Electric Storage Battery Co., Philadelphia, has elected as vice president in charge of engineering Lester E. Lighton, manager, department of development and design.

Warren Steam Pump Co., Inc., Warren, Mass., has appointed William R. Hill as general sales manager of industrial and commercial sales. His most recent previous connection was for nine years with the Carrier Corp., Syracuse, N. Y.

Pacific Car & Foundry Co., Seattle and Renton, Wash., has acquired controlling interest in the Kenworth Motor Truck Corp., Seattle. No changes are planned for the duration in the Kenworth organization.

DeLaval Steam Turbine Co., Trenton, N. J., has appointed Charles C. Bray as assistant to the manager of the worm gear division. He has lately been metallurgist for the special steel department of the Philadelphia office of Joseph T. Ryerson & Sons, prior to which he served ten years as a worm gear sales engineer in the DeLaval Chicago office.

Walter Motor Truck Co., Ridgewood, L. I., has appointed George R. Morgan as factory representative for Walter snow fighters and tractor trucks in Minnesota, Iowa, Illinois, North Dakota, South Dakota, Michigan and Ohio, with headquarters in Minneapolis.

British manufacturers of Colliery Equipment wish to contact U. S. manufacturer with view to manufacture in England and exchange of ideas. Write Box 7421 Glovers Advertising, Bristol 1, England.

HERCULES
AUGERS

Hercules Augers

Ideal for modern high speed electric drills—[illegible] stands whips and torsional strains. Flint hard and tough as whalebone. Drills faster—[illegible] more holes with resharpening—outlasts four to five ordinary drills. Recommended for the hardest jobs. Up to 3" diameters—up to 16 ft. in length.

Black Diamond Augers

Carefully made from high-carbon crucible grade steel—heat-treated to obtain as much hardness and toughness as possible, to prevent broken tangs and points. Furnished up to 2" diameters—maximum over-all lengths 16 ft.

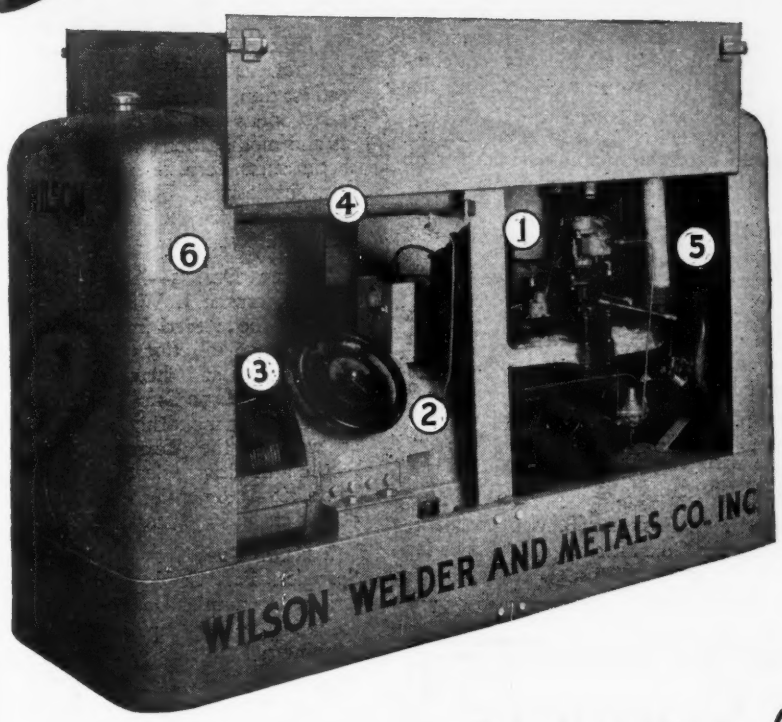
Standard Augers

Originally developed for use with hand drills. These augers work best at hand drilling drilling holes under stumps, and ditch blasting. Up to 2" diameters from oval steel 7/16" thick, and maximum length of ten ft.

Call on us for any type auger you may require in your operations. We specialize in manufacturing the better grade alloy, heat-treated augers. Write, wire or 'phone for details concerning sizes, prices, deliveries, etc.

SALEM TOOL COMPANY
SALEM OHIO

6 Features that give the "YELLOW JACKET" its famous penetrating "stinger"



1 New, improved idling device acts instantly—needs no maintenance.

2 Convenient handwheel provides easy, and accurate current control.

3 Wide current range divided into 'high' and 'low' by a Selector Switch.

4 Over-size gas tank eliminates shutdowns for refueling.

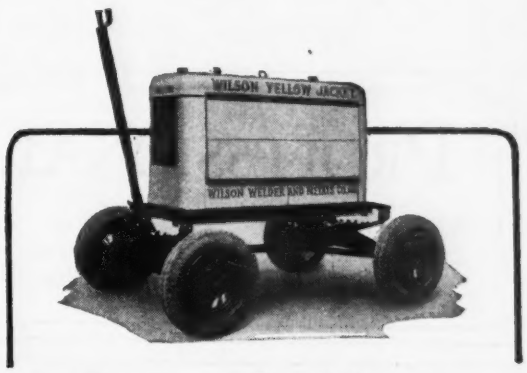
5 Industrial type radiator with protecting grille for ample cooling of engine.

6 Sturdy, weatherproof case, finished in moisture-proof enamel, completely shields internal parts against entrance of rain, sleet, etc.

THE features above are only a few of the reasons why the Wilson "Yellow Jacket" is recognized as a production-booster for field welding of all kinds. Complete and self-contained, the "Yellow Jacket" is noted for • its deep, penetrating arc • fast response • easy, accurate control • close-coupling between engine and generator • sturdy weather-resistant construction • and trouble-free, reliable performance.

It gives a maximum of service with an absolute minimum of attention and upkeep. In every respect—output, operation, convenience and maintenance—it meets the exacting requirements of pipe line welding, construction and similar field work.

Made in 200, 300, and 400 ampere sizes, the "Yellow Jacket" is supplied as a stationary unit or in two portable types. Mail coupon for free folder giving full details.



Made in Portable Types

The "Yellow Jacket" is available in two mobile models: 1. Mounted on a four-wheel, pneumatic-tired* trailer unit, equipped with automobile type springs and steering gear. 2. Mounted on four-wheel trailer equipped with steel spoke wheels.

*Tires not supplied with unit.

★ BUY UNITED STATES WAR BONDS ★

AIR REDUCTION

General Offices: 60 East 42nd Street, New York 17, N. Y.
In Texas: Magnolia Airco Gas Products Co. General Offices: Houston 1, Tex.
Offices in all Principal Cities

Air Reduction
60 E. 42nd Street
New York 17, N. Y.

Please send me free bulletin on Wilson "Yellow Jacket", ADW-19B.

Name.....

Company.....

Address.....

City..... State.....

WESTERN MACHINERY CO., and Western-Knapp Engineering Co., San Francisco, Calif., have appointed Herbert Mayer as general manager of the two companies.

NATIONAL BATTERY CO. announces that effective March 1, H. G. Barnes will succeed Herbert King as its vice president in charge of sales as well as of the Gould Commercial Division.

ALLIS-CHALMERS MFG. CO., Milwaukee, Wis., has appointed Archibald J. Cooper as manager of its New York district office. Formerly assistant manager of the New York office, Mr. Cooper succeeds A. F. Rolf, who now will devote full time to his duties as assistant secretary of the company. Jay C. Warner has been named to assist in development of the company's sales in the Far East, Australia and New Zealand.

WESTINGHOUSE ELECTRIC & MFG. CO. has appointed Norman C. Hurd as acting manager of its Cincinnati manufacturing and repair department.

ROBERTS & SCHAEFER CO., Chicago, has appointed L. A. Updegraff as sales and service engineer for the West Virginia, Virginia and eastern Kentucky coal fields, with headquarters at 2116 Washington St., Bluefield, W. Va.

AMERICAN CAR & FOUNDRY CO. announces that W. E. Olds has joined the organization as sales agent, with headquarters at the Chicago office.

TIMBER ENGINEERING CO., Washington, D. C., has appointed Robert L. Fletcher to its engineering staff following his recent return from five years overseas as a civilian engineer with the Army Engineers.

GENERAL ELECTRIC CO. has given direction of application and service engineering in the company's apparatus department to C. H. Lang, vice president and manager of apparatus sales. A. K. Bushman has been appointed manager of application and service engineering.

•

E. F. Austin Dies

Edward F. Austin, for the last 16 years a vice president and Pittsburgh district manager for the Brown-Fayro Co., Johnstown, Pa., died Jan. 17 at his residence in Pittsburgh. Previous to his association with Brown-Fayro he was for 20 years connected with the Dravo-Doyle Co., Pittsburgh.

SYDNEY A. FOSTER, 58, vice president, L. B. Foster Co., Pittsburgh, Pa., and for many years manager of its New York office, died recently in the latter city.

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Trade Literature

CHEMICALS AND EXPLOSIVES—Hercules Powder Co., Wilmington, Del. Booklet Form 669 indexes products according to various industries in which they are used and then according to chemical families. An indication of many postwar applications for the chemicals in plastics, paints, textiles, film, adhesives and paper is given, and chemicals in the cellulose family, rosins and modifications, rosin esters and synthetic esters, terpene solvents and chemicals, explosives, blasting supplies and sporting powders, and special products are discussed.

V-BELT DRIVES—Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Catalog B6051E gives all the needed information to make correct drive selections reduced to handy charts, tables and drawings. Covered are the new "Magic-Grip" sheave, designed for fast, easy mounting and dismounting, as well as the Texrope "Econograph" method of drive selections. List prices, stock sizes, dimensions and construction details are included for all Texrope drives.

MINING SUPPLIES—J. V. Hammond, Spangler, Pa. Catalog 10 lists and describes a number of mining supplies, including safety explosive boxes, wood tamping poles for horizontal holes in strip mining, straight shovel handles, wood mine-haulage rope rollers, brake blocks, roller brackets or bearings, trolley poles, mine-car sprags, machine bit boxes, shotfirer cable reels, wire reels for use with blasting machines, cast-iron hoist sheaves, mine-car trip signals, insulation blocks and tool handles.

HOSE COUPLINGS—Hose Accessories Co., Philadelphia 32, Pa. Catalog 644 gives data for selection of hose couplings for various service applications besides descriptions of units and how to attach.

DRAGLINE BUCKETS—Daniels-Murtaugh Co., Cedar Rapids, Iowa. Catalog 14 shows complete line of Dragliner dragline buckets, made in four types—for heavy duty, medium duty, all purposes and light duty—having manganese steel bumpers to prevent the arch from hitting the ground when bucket is dropped. Another feature is the flat-top arch to eliminate binding of material being loaded or dumped. Also described are Coaloader dippers, teeth for dragline buckets and dippers, manganese steel chains, fittings and accessories for dragline buckets.

SAFETY CLOTHING—American Optical Co., Southbridge, Mass. Booklet lists and describes safety clothing for male welders, including overalls, all-leather pants, hot-weather pants, chaps, aprons, coats, cape sleeves and bib, short jacket, sleeves and sleevelets, gloves, mittens and spats.

BLACK AND WHITE PRINTS—Charles Bruning Co., Inc., 4700 Montrose Ave., Chicago 41, Ill. Bulletin A-1010 cites time- and cost-saving methods embodied in BW process for making black and white prints as distinguished from blue prints.

PROFESSIONAL SERVICES

Consulting Engineering Examinations
Specialists Geologists Reports
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ALLEN & GARCIA CO.
ENGINEERS AND BUILDERS OF MODERN COAL OPERATION
Authoritative Valuations and Reports of Mining Properties Equipment and Operation.
332 S. Michigan Ave., Chicago
120 Wall Street, New York, N. Y.

T. W. GUY
COAL PREPARATION
To Yield Maximum Net Returns
Face and Product Studies
Plant Design and Operation
Coal Sampling
Kanawha V. Bldg. Charleston, W. Va.

GEO. S. BATON & CO.
Consulting Engineers
Valuation, Mine Mechanization and Coal Preparation.
1100 Union Trust Bldg.
Pittsburgh, Penna.

C. C. MORFIT & ASSOCIATES
Consulting Engineers
Reports, Valuation, Construction, Operation, Management
11 Broadway, New York 4, N. Y.

EAVENSON & AUCHMUTY
Mining Engineers
Coal Operation Consultants
Valuations
Koppers Bldg. Pittsburgh, Pa.

SHERWIN and JANVRIN
Mining Engineers
Pineville, Ky.
Reports on COAL PROPERTIES
Planning, Construction & Supervision

J. H. FLETCHER
30 Years
Continuous Consulting Service to Coal Mines
Telephone Harrison 5151
McCormick Building Chicago, Illinois

L. E. YOUNG
Consulting Engineer
MINE MECHANIZATION
MINE MANAGEMENT
Oliver Building—Pittsburgh, Pa.

Among the reasons Stephens-Adamson has been called on so many times to assist in the installation of coal handling systems, is this company's ability to solve virtually *any* handling problem. Take the single operation of loading cars without excessive breakage of coal. Here, the solution is an S-A Pan Conveyor.

In the illustration above, you are looking at the discharge end of the conveyor from a point in the car itself. This section is hinged to permit raising or lowering, depending on the level of coal in the car. Coal coming down the conveyor does not drop—instead, it is simply shunted gently off the end without breakage of lumps.

On the floor above, a horizontal section of the same Pan Conveyor serves as a picking table, permitting the removal of impurities, foreign matter, etc. For further information, write us today.

STEPHENS-ADAMSON MFG. CO.

RIDGEWAY AVENUE, AURORA, ILLINOIS — LOS ANGELES, CALIF. ★ BELLEVILLE, ONT.

Designers and Manufacturers of All Types of

BULK MATERIAL HANDLING EQUIPMENT

EXPERIENCE COUNTS

Bituminous Casualty has always written more Workmen's Compensation insurance for the coal industry than any other carrier.

Experience in your operations and an understanding of your problems gained through 27 years of close contact with mine properties has become an asset of great value. It assures efficiency and sympathetic cooperation in the protection of your risks.

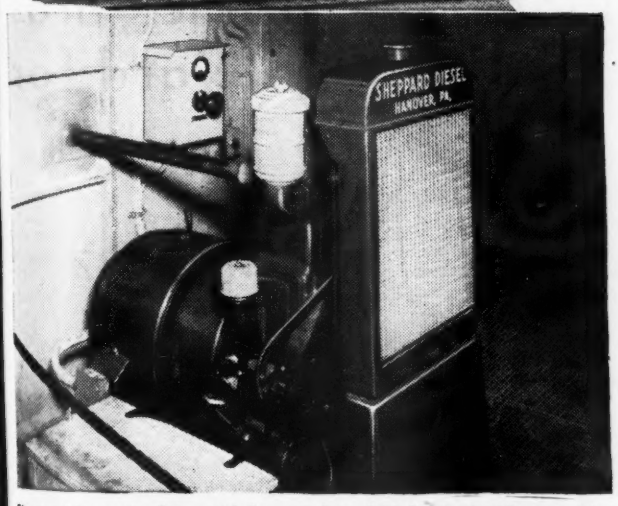
Workmen's Compensation and General Liability Insurance

BITUMINOUS CASUALTY CORPORATION

ROCK ISLAND ILLINOIS

CHEAPER FUEL MEANS

Cheaper Electricity WITH A Sheppard DIESEL GENERATING SET



Sheppard Generating Sets provide low-cost, dependable lighting for 30-ton revolving barge-mounted cranes. These cranes are being built by Turney Manufacturing & Engineering Co. of Houston, Texas... Washington Iron Works, Seattle, Wash.... Pointer-Willamette Co., Portland, Ore. Note cleanliness and compact arrangement of entire unit.

LOWERS NIGHT OPERATING COSTS FOR HUGE 30-TON REVOLVING CRANE

IN hundreds of installations like this one, Sheppard Diesel Generating Sets cut electric bills for users. These generating sets make low cost electricity from cheap fuel. They'll even operate efficiently on the lowest priced domestic furnace oil! And use less of it! . . . for Sheppard Diesels are engineered to squeeze every last watt of power from every last drop of fuel!

Besides being thrifty, Sheppard Diesels are the simplified Diesels that give dependable service in the hands of any average operator. They're delivered fully adjusted . . . fully equipped. A Sheppard goes on the job fast . . . and stays on the job for keeps.

A limited number of Sheppard Diesels are now available. Let us advise you about obtaining WPB approval.

Mail coupon today for free literature describing Sheppard Diesel Generating Sets.

POWER UNITS, 8 TO 50 HP • GENERATING SETS, 3 TO 30 KW

R. H. Sheppard Company
111 Middle St., Hanover, Pa.

Please send me free literature describing Sheppard Diesel Generating Sets.

Name ----------

Firm Name ----------

Address ----------

Sheppard
ALL AMERICAN DIESEL GENERATING SETS

7½ MILLION CUBIC YARDS OF TOUGH OVERBURDEN "NON-STOP"

25-CUBIC-YARD PAGE *Automatic* AT WORK

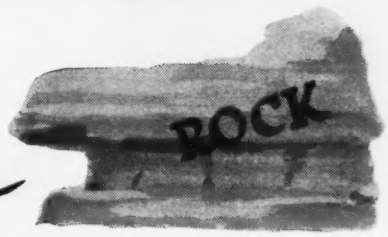
The first 25-cubic-yard dragline bucket is a Page Automatic owned by the Northern Illinois Coal Corporation. It is shown at work, and below after its non-stop run of 7½ million cubic yards when it was sent to the yard for its first reconditioning.

SAME PAGE AUTOMATIC AFTER 7½ MILLION CUBIC YARDS OF STRENUOUS WORKOUT

PAGE ENGINEERING COMPANY · CHICAGO 38, ILLINOIS

TO GET THIS OUT *Quicker*

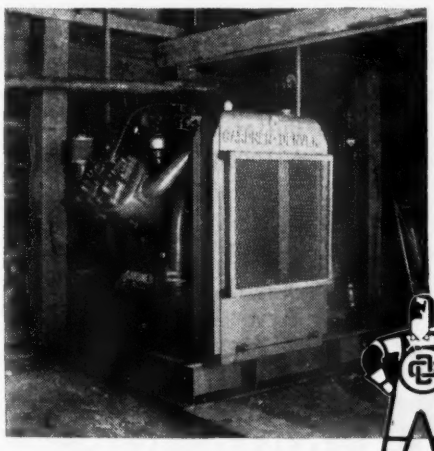
REMOVE THIS *Faster*



MAKING ROCK "FLY" . . . speeding up sinking . . . driving haulage ways . . . Gardner-Denver air equipment helps you get the coal out *faster*. The ability of this proved equipment to eliminate unnecessary delays in getting at the coal . . . to keep operating dependably under severe service conditions is a big aid to bigger tonnage.

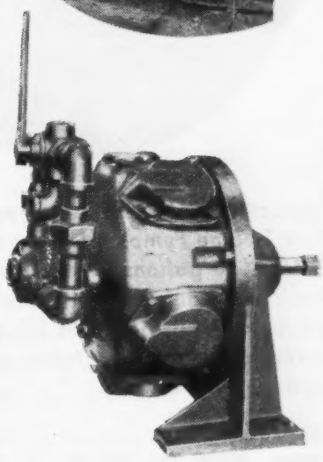
Gardner-Denver Hand-held Drills are powerful, well-balanced, and easy to handle. Their exceptional hole-cleaning ability speeds drilling in both rock and coal.

Gardner-Denver "WB" Vertical Two Stage Water-cooled Compressors assure large air output plus compact, space-saving design. Because they have a self-contained cooling system, they eliminate the need for outside water piping. They are easily moved from location to location.



Gardner-Denver Continuous Feed Drifting Drills speed the driving of haulage ways, shaft sinking and headings. Their built-in feed motor smothers vibration . . . assures less operator fatigue. Shorter over-all length permits better pointing of holes in driving entries.

Gardner-Denver Air Motors are powerful, five-cylinder radial types especially suited for use where conditions are unfavorable for electric or gas motor drives. Easily adaptable for use in driving winches, conveyors, fans, drills, pumps and other equipment.

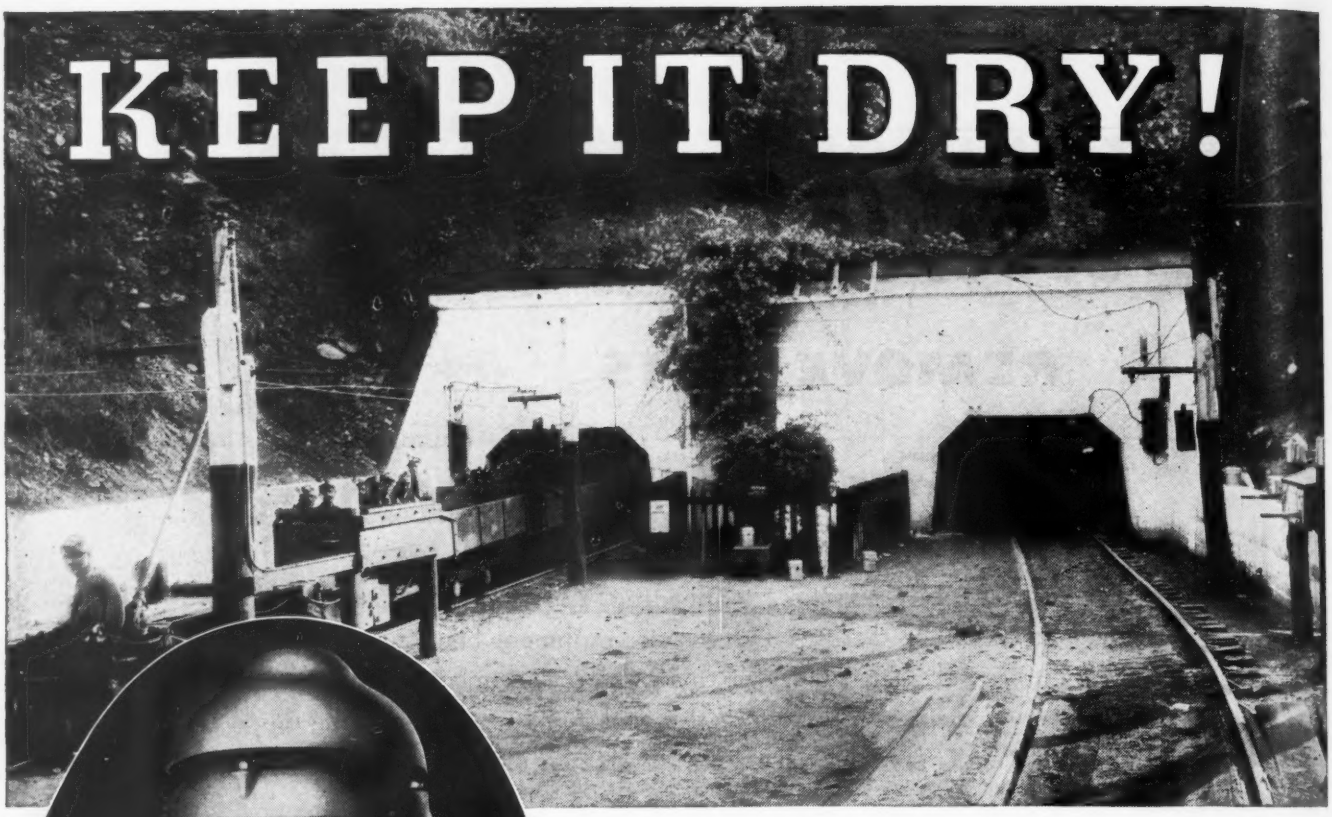


For complete information on Gardner-Denver air equipment, write Gardner-Denver Company, Quincy, Illinois

Since 1859

GARDNER-DENVER

KEEP IT DRY!



Capacities of Deming Deep Well Turbine Pumps range from 15 to 3,000 gallons per minute. Furnished regularly with standard unit drive head as illustrated or with other types of heads where required.

DEMING TURBINE PUMPS KEEP OUT MINE WATER!

Increasing use of Deming Deep Well Turbine Pumps for dewatering service is due to two important factors:

1. Dependable operation under peak load and continuous service conditions.

2. Big savings in power costs, labor costs, and initial equipment costs compared with less efficient types of pumping units.

Among the many features of Deming Deep Well Turbine Pumps are the Goodrich cutless rubber bearings which are lubricated constantly and positively by water from the sump.

Original high efficiency is maintained by the easily adjustable impeller clearance (adjustable from the surface for capacity and wear after long service.) Full details in Turbine Bulletin 4700-8. Complete Deming Mine Pump Bulletin 1000 also sent upon request.

DEMING *Mine* PUMPS

THE DEMING COMPANY • SALEM, OHIO, U. S. A.

THE ORIGINAL
A V. C. CONSTRUCTION

1. Flexible tinned copper conductor, perfectly and permanently centered in helically applied insulation.

2. Paper separator makes stripping easy; prevents insulation from sticking to conductor.

3. Felted asbestos insulation, impregnated with heat, flame and moisture resisting compounds, withstands conductor heating overloads and won't dry out, bake brittle or burn.

4. Varnished cambric for high dielectric strength and added moisture resistance, protected from heat, flame and oxidation by two felted asbestos walls.

5. Outer felted asbestos wall, also impregnated with heat, flame and moisture resistant compounds, serves as an effective barrier against high ambient temperatures and flame.

6. Heatproof, fireproof asbestos braid, resistant to moisture, oil, grease and alkalies, is diametered to properly fit bushings.

For sizes and diameters refer to McGraw-Hill Mining Catalogs or write to Rockbestos Products Corporation, P. O. Box 1102, New Haven 4, Conn.

122 different wires and cables have been developed for severe operating conditions by Rockbestos.

There's no place in today's tough schedules for "time out." Rewire with Rockbestos A.V.C. Mining Cable and *know* that your cutters, loaders and locomotives won't have to quit because of internal cable failures.

Rockbestos A.V.C. Mining Cable—with its *permanent* impregnated asbestos insulation—will stand up under the toughest operating conditions; won't break down under copper-heating overloads, moisture, oil, grease or alkalies; won't bake brittle, dry out, crack, bloom, swell or rot; and won't burn or carry flame.

Used and recommended by leading equipment builders and mine electricians, Rockbestos A.V.C. Mining Cable *insures* "time-table" tonnage.

Rockbestos Products Corp., 1102 Nicoll St., New Haven 4, Conn.

ROCKBESTOS A.V.C.

The Cable with Permanent Insulation

ORDER FROM THESE JOBBERS—SPECIFY "ROCKBESTOS A.V.C."

BECKLEY, W. VA.:	Beckley Mach. & Elec. Co.	EVANSVILLE, IND.:	Evansville Elec. & Mfg. Co.	PITTSBURGH, PA.:	Upson-Walton Co.
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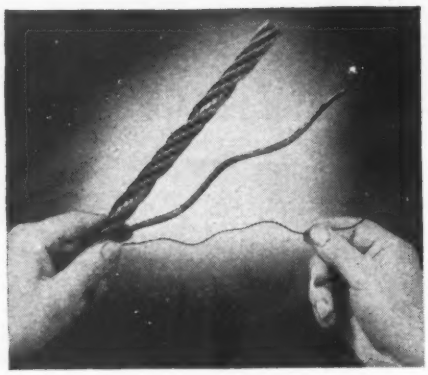
FOR VICTORY — GET OUT COAL and INVEST IN U. S. WAR BONDS

"Here are 6 reasons why I like Macwhyte PREformed Wire Rope!"



HERE'S HOW Macwhyte PREformed Wire Rope is made. Notice that the wires have a spiral shape. They have been PREformed. When the rope is made, both wires and strands fit naturally into position with a minimum of internal stress and friction.

Keep asking for MACWHYTE PREformed!

The demands of our armed services are so great now, there may be times when we cannot give you our usual prompt service and delivery. The situation changes from day to day, so please keep trying. We'll serve you if we possibly can.

MACWHYTE PREformed WIRE ROPE — Plus Internal Lubrication Selected Steels Tested-Proved

The correct rope for your equipment

"For maximum wire rope satisfaction and service, give me Macwhyte PREformed every time."
"Here's why!"

- ***"FIRST, Macwhyte PREformed lasts longer.***

  I've found that it outwears non-PREformed ropes by a big margin. That's because internal friction and fatigue are virtually eliminated. In Macwhyte PREformed, each wire and strand are shaped to lie *naturally* in the rope."

- ***"SECOND, it's more economical.***

  Because of the extra-long service Macwhyte PREformed gives, I get lower cost per load carried. My records show it actually saves me money!"

- ***"THIRD, it means fewer shut-downs.***

  That's mighty important to me, because I need every man-hour possible to maintain production schedules."

- ***"FOURTH, it's easy to install.***

  Macwhyte PREformed does not kink during unreeling. It is extremely flexible and can be put on equipment *fast*, thus saving precious time."

- ***"FIFTH, it is safer to handle.***

  Macwhyte PREformed can be cut without seizing. Broken wires stay in place, do not wicker out to injure workmen's hands."

- ***"SIXTH, Macwhyte PREformed has Internal Lubrication:***

  Heavy lubricant improves the sliding action of wires as they move in bending around sheaves and drums. In many cases the inside wires are in good condition after the outside wires are seriously worn."

MACWHYTE COMPANY

ARMY E NAVY

Wire Rope Manufacturers

2931 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York • Pittsburgh • Chicago • Fort Worth • Portland • Seattle • San Francisco. Distributors throughout the U.S.A:

MACWHYTE PREformed and Internally Lubricated Wire Rope — MONARCH WHYTE STRAND Wire Rope — MACWHYTE Special Traction Elevator Rope — MACWHYTE Braided Wire Rope Slings — MACWHYTE Aircraft Cables and Tie-Rods — MACWHYTE Stainless Steel Wire Rope — MACWHYTE Monel Metal Wire Rope

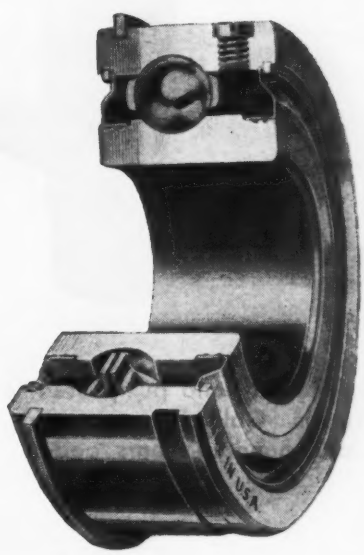
NATURE *provides*

...EXTRA GREASE CAPACITY FOR PROTECTION

But — among "Self-Protected" and "Sealed" bearings it's the NORMA-HOFFMANN "CARTRIDGE" BALL BEARING that provides that extra—more than double—grease capacity so vital to long life, low maintenance and minimum attention.

• • •

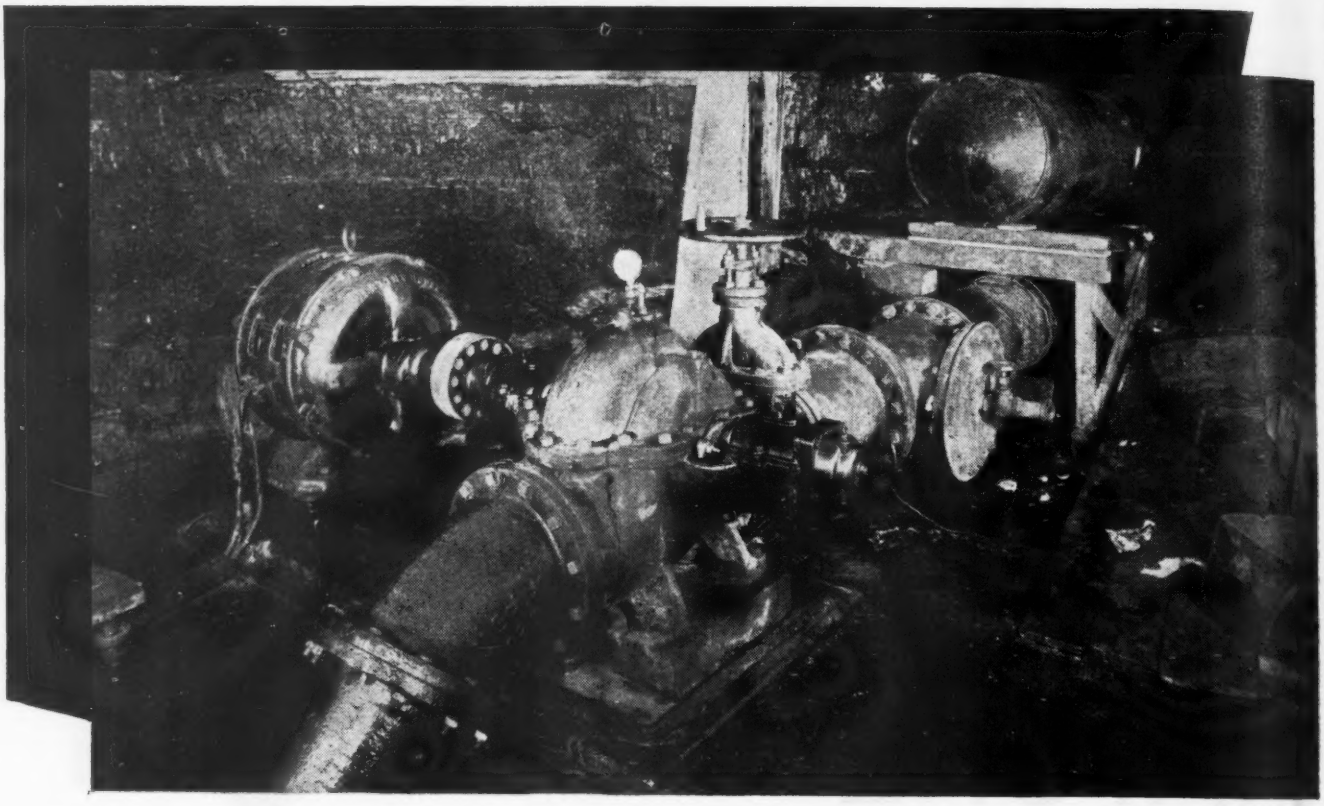
There are many other distinctive — and equally valuable — features, in the "CARTRIDGE" Bearing.



Write for full details to our nearest office. Or,—better yet—ask them to send one of our engineers to discuss your bearing problem—in strict confidence, of course.

NORMA-HOFFMANN BEARINGS CORP'N. STAMFORD, CONN. *Founded* 1911

Field Offices: NEW YORK • CHICAGO • CLEVELAND • CINCINNATI • PITTSBURGH • DETROIT • LOS ANGELES • SAN FRANCISCO • SEATTLE, WASH.



This Warren Pump in Coal Mine Cuts Pumping Costs Each Month

Wooden hand pump used to drain Gallitzin area mine, one hundred years ago.

A bituminous mine in the Gallitzin area of central Pennsylvania found its old power pumps inadequate to handle drainage. Warren engineers were called in. They recommended the all-bronze, chrome-fitted centrifugal pump shown above.

Capacity; 3500 gallons per minute; 12" suction, 10" discharge openings. In dry seasons, need be operated for only 7 to 10 hours a week. It saves mine owners many dollars in pumping costs each month.

For complete specifications and ratings on this and other Warren Pumps, send for Bulletin 227-1.

ARMY E NAVY

WARREN STEAM PUMP COMPANY, INC.

WARREN, MASSACHUSETTS

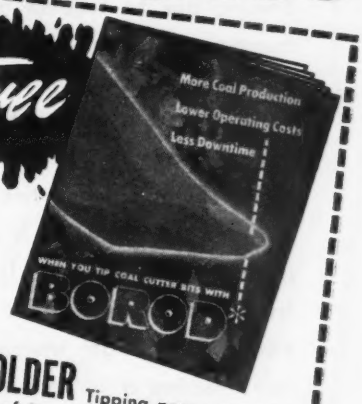
with BOROD* TIPPED BITS

BECAUSE coal cutter bits tipped with Borod stay sharp and resist wear, up to 3 times more kerf can be cut per hour of operation! Borod is a Stoody hard-facing alloy of pure tungsten carbide particles contained in mild steel tubes. Because of its hardness and cutting ability, Borod tipped bits stay on the machine longer, save downtime for bit changes, save power, get more coal production from the same equipment in less time!

STOODY COMPANY, 1143 W. SLAUSON AVE., WHITTIER, CALIFORNIA

*Borod is a copyrighted Stoody tradename for this special Stoody alloy.

Free



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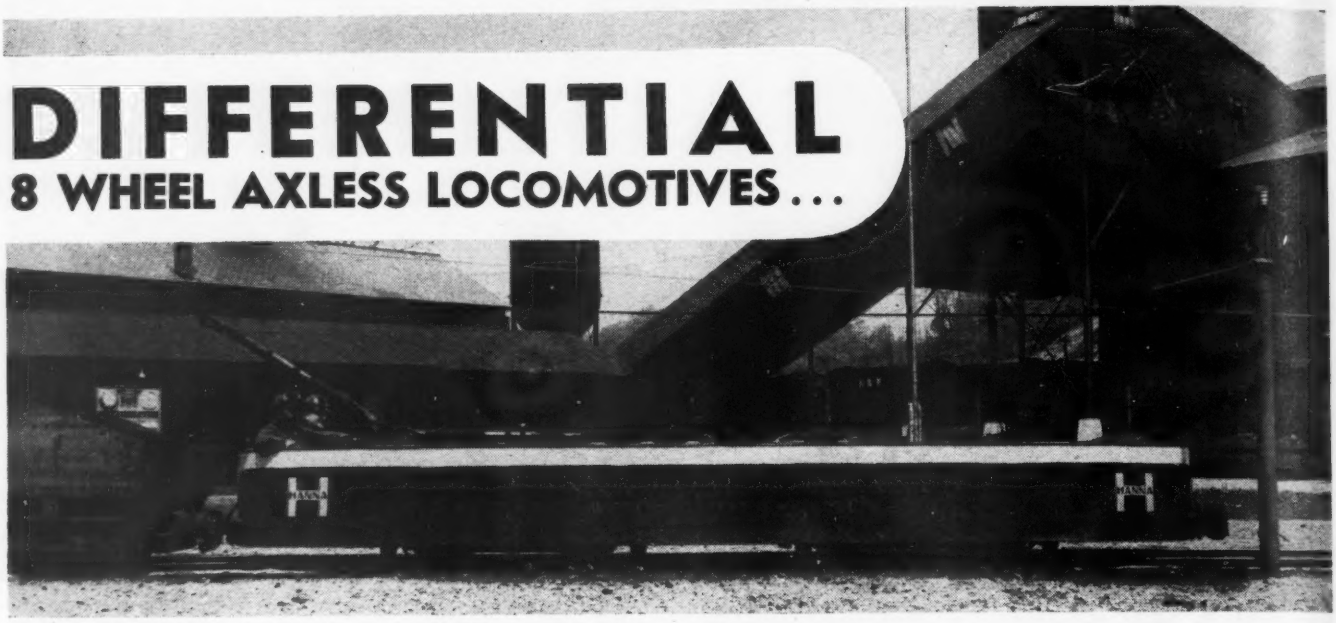
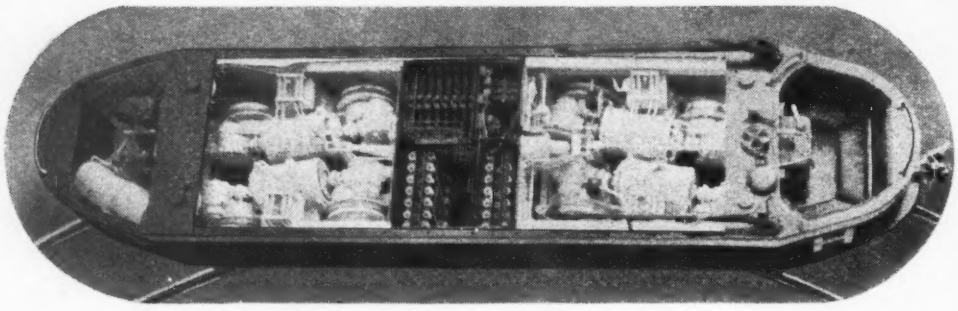
STOODY HARD-FACING ALLOYS

Retard wear... Save Repair

DIFFERENTIAL
8 WHEEL AXLESS LOCOMOTIVES...

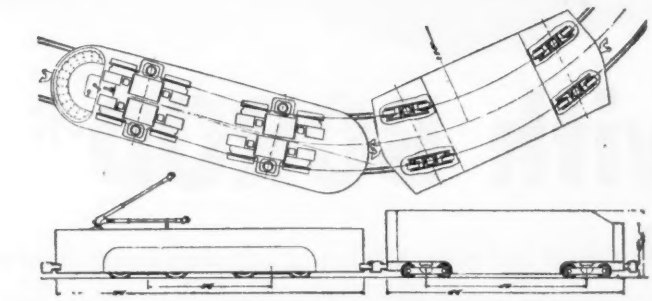


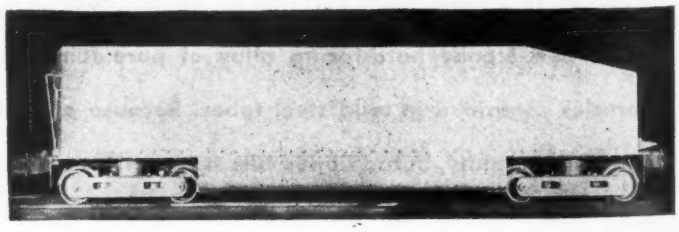


Plan View . . .

shows 21-ton Differential AXLESS locomotive on a 25-foot radius curve — notice compact design and accessibility for easy maintenance.

• Differential 360 HP 8-wheel AXLESS locomotives provide ample power for hauling larger trains—faster—at lower cost. These streamline heavy duty locomotives have more adhesion available for tractive effort and braking due to tandem drive corrective for transfer of weight. There is no connection between wheels on one rail and wheels on the other, therefore, in negotiating a curve there is no slippage caused by difference in wheel travel. By eliminating this slippage, adhesion between rail and wheel is unbroken and there is no drawbar pull loss. This modern AXLESS truck locomotive provides greater traction—power on all eight wheels—smooth riding—thus enabling it to haul heavy loads at high speeds in safety. Full anti-friction bearings and gears operate in a bath of oil sealed away from dirt.





Large Differential mine cars with patented 8 wheel AXLESS trucks provide greater carrying capacity within a limited height—require fewer cars and less maintenance. Smooth riding reduces spillage on haulage ways and assures safety at higher speeds. Less cost per ton—more tons per shift.

DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO, U. S. A.

Builders of Haulage Equipment Since 1915

AIR DUMP CARS · MINE CARS · MINE LOCOMOTIVES · ROCK LARRIES · DUMPING DEVICES
BURDEN-BEARING LOCOMOTIVES · STOCKPILING CARS · COMPLETE HAULAGE SYSTEMS

Makeshifts

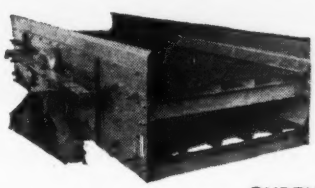
versus

EQUIPMENT THAT FITS YOUR NEEDS

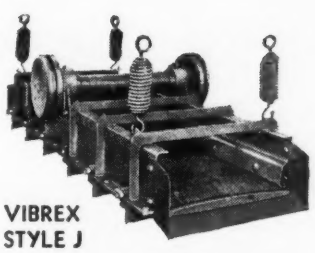
You know your mine—its problems, its capabilities, its needs. You, better than anyone else, know the kind of equipment that will best do your job—your way. And that's exactly what you get—when you come to Robins.

For Robins never tries to sell "misfits" or "makeshifts". Because Robins makes a complete line of machinery to meet practically every bulk materials handling need.

Take Screens, as an example. Robins not only makes many types, for a wide variety of purposes, but has contributed several innovations to this field, such as the invention of the Circle throw principle.



GYREX



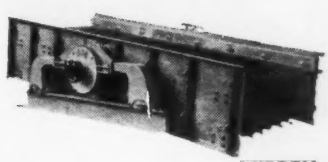
VIBREX STYLE J

Through Robins you have your choice, for instance, of:

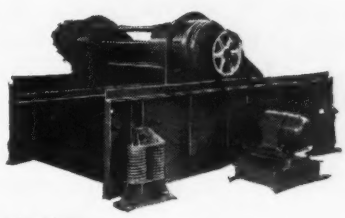
Gyrex Screens, using a positive eccentric principle: made with a steel or cast-iron base, for floor or suspended mountings; in sizes 24" x 54" to 72" x 192"; 1, 2 or 3 decks; capacities to 1000 tons per hour.

The Vibrex Screen, utilizing a centrifugal force created by offset counterweights. Made in Style J for suspended mounting, vibrator above or below frame, in sizes 24" x 48" to 24" x 72", single deck only; and in Style M for floor mounting, in sizes 36" x 78" to 48" x 120", 1 or 2 decks.

Then, for sharpest screening at high capacity, or for dewatering, the Robins Eliptex, employing an elliptical throw counter-to-flow of material. Requires less headroom. Made in sizes 36" x 96" to 72" x 192" with 1, 2 or 3 decks.



VIBREX STYLE M



ELIPTEX

These Screens, as well as others in the Robins line, are adaptable to a wide range of cloth openings and weaves, to provide exactly the kind and size of Screen you need for every screening purpose.

So whatever your requirement—get in touch with Robins. If you already know what you want, it can be ordered from Robins with confidence. But if you believe your production processes might be improved, our engineering department will gladly survey your conditions and offer specific recommendations, based on years of experience with every kind of screening problem. When writing, please address Dept. CA-2.

ENGINEERS, MANUFACTURERS AND ERECTORS OF MATERIALS HANDLING MACHINERY

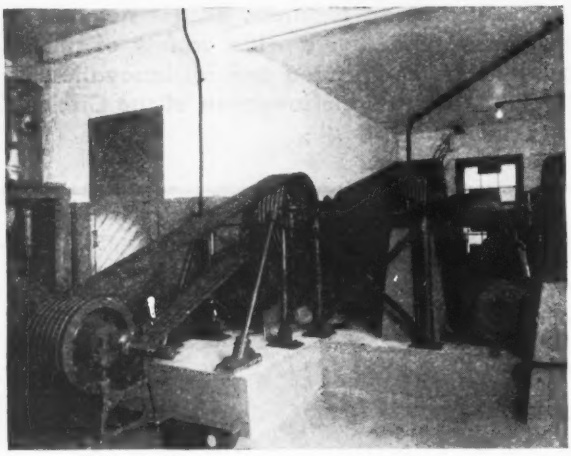
ROBINS *makes:* BELT CONVEYORS · COAL AND ORE BRIDGES · BUCKET ELEVATORS · CAR AND BARGE HAULS · CAR DUMPERS · CAR RETARDERS · CASTINGS · CHUTES · CONVEYOR IDLERS AND PULLEYS · CRUSHERS · FEEDERS · FOUNDRY SHAKEOUTS · GATES · GEARS · GRAB BUCKETS · PIVOTED BUCKET CONVEYORS · VIBRATING SCREENS · SCREEN CLOTH · SELF-UNLOADING BOAT MECHANISMS · SKIP HOISTS · STORAGE AND RECLAIMING MACHINES AND SYSTEMS · TAKEUPS · LOADING AND UNLOADING TOWERS · TRIPPERS · WEIGH LARRIES · WINCHES · WINDLASSES

FOR MATERIAL AID IN MATERIALS HANDLING . . . . . It's ROBINS

ROBINS
CONVEYORS
INCORPORATED
Founded in 1896 as Robins Conveying Belt Co.
PASSAIC • NEW JERSEY

Continental

Mine Fan Drives *Meet Highest Safety Standards*



This Continental installation in a modern coal mine shows Mine Fan V-Belt Drive operated by electric motor with auxiliary V-Belt Drive from Diesel Motor which can be quickly shifted over in case of power failure.

Continental manufactures an extensive line of modern coal mine equipment, including:

Shaker pans, hoists, belt conveyor idlers and accessories, apron feeders, and a complete line of power transmission equipment.

Complete engineering service and manufacturing facilities for standard and special equipment.

Send us your inquiries.

FOR THE WAR EFFORT

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Since October 1941

INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

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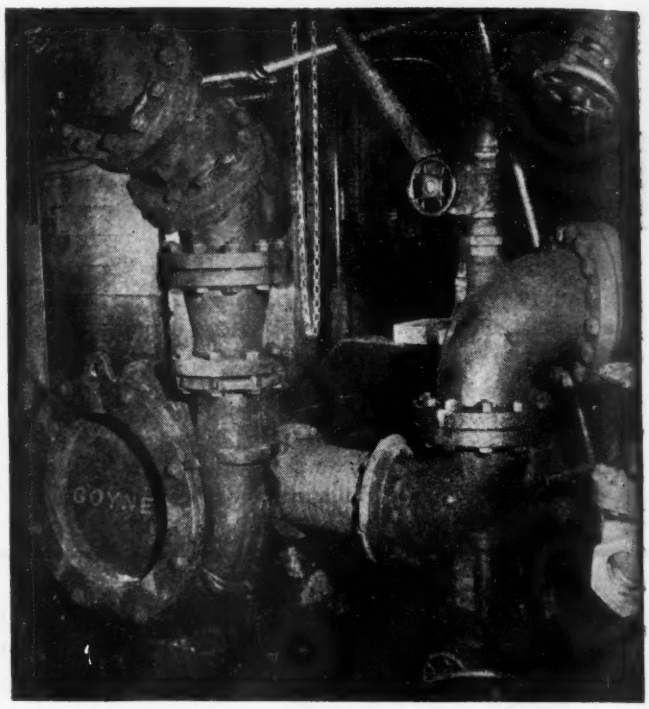
GOYNE PROCESS PUMPS



A Sand Pump is only a link in a chain in a coal washing plant, but it can be a strong link if it embodies the following features as does the Goyne:

1. Ease of inspection of all wearing parts. All internal portions are immediately accessible after removing only the rear head of the pump. No suction or discharge piping is disturbed.

2. The one packing box of the pump is subjected only to suction pressure and is readily kept clean by a low pressure clear water line. Long packing and shaft sleeve life is assured.

3. Impeller clearance is adjusted *while the pump is running*, insuring constant pump capacity so essential for uniform washing.

4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and simplifies piping.

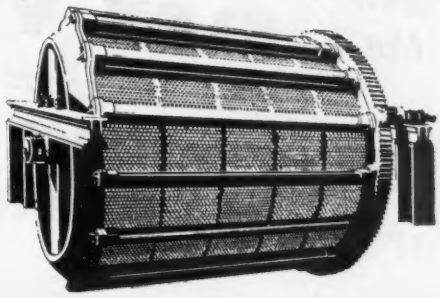
5. We carry the spare parts stock. Order your replacements when needed. Reduce your inventory by using Goyne Process Pumps.

All inquiries receive prompt and careful attention.

THE GOYNE STEAM PUMP CO.

ASHLAND, PA.

"PENNSYLVANIA" BRADFORDS ARE *TOPS*



FOR

- Salvaging Picking Table Refuse
- Crushing Steam Shovel Feed (automatically remove big rock)
- Crushing & Cleaning Mechanically Loaded ROM Coals
- Eliminating Large Tramp Iron (automatically)
- Abnormally Low Annual Upkeep
- Dependable, Continuous, Automatic Operation (minimum operating labor)
- For Coal Mines, Central Power Stations, Coking Plants, Gas Works

For all-around year-in year-out satisfaction, use a Steel-built "Pennsylvania". No other Type Crusher, whether Hammermill, Single or Double Rolls, etc., compares with a patented "Pennsylvania" Bradford for hard gruelling service.

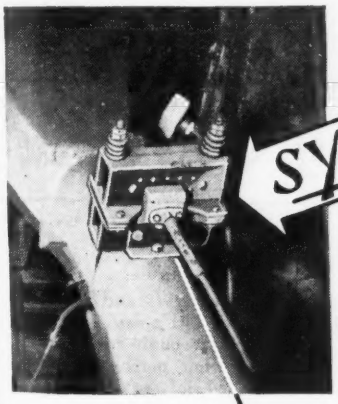
WRITE US YOUR PROBLEM

PENNSYLVANIA CRUSH COMPANY

1706 LIBERTY TRUST BLDG., PHILADELPHIA, PA.

New York, Pittsburgh, Chicago, Los Angeles, Birmingham

Associated with Fraser & Chalmers Engineering Works, London, England



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ELECTRIC VIBRATORS

with Adjustable Power

Assure

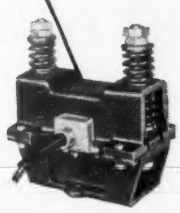
FREE FLOWING

Coal Bunkers and Chutes

Eliminate costly coal stoppages, by preventing "arching-over" and "hanging-up".

Available in eight sizes — from a little 4 lb. model up to a big 500 lb. model.

Write us about your problem



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Homer City, Pa.

The Cincinnati

TRADE MARK

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ONE-MAN COAL DRILL

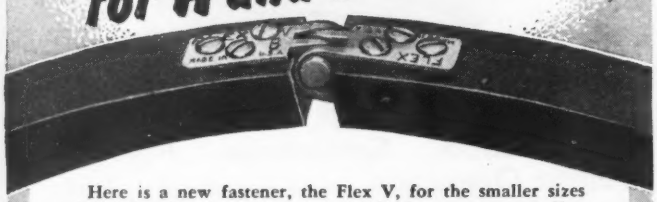
. . . lowers drilling costs because it is designed and constructed to give more power "pound for pound" and more drilling efficiency "day after day". Used successfully in drilling both anthracite and bituminous coal. Easy to operate. Sold with money-back guarantee. Write today.

THE CINCINNATI ELECTRICAL TOOL CO.

Division of The R. K. LeBlond Machine Tool Co.
2635 MADISON ROAD - CINCINNATI 8, OHIO

and now the **FLEX V** TRADE-MARK

A new Fastener for A and B V-belts



Here is a new fastener, the Flex V, for the smaller sizes of V-belts that is going to establish the same outstanding performance record as the Alligator V-belt fastener has already established for the larger sizes of V-belts.

This new Flex V fastener is made in two sizes for A and B section V-belts. It is simple in design, easy to apply and the separable hinge joint makes for quick replacement of V-belts without dismantling shafting or machinery. No metal touches the pulley so Flex V fastened belts can be run on a V-flat drive.

Folder No. V-12 gives complete details on this new Flex V fastener with list prices, special tools and application information. Your request will bring a copy.

Order from your supply house

FLEXIBLE STEEL LACING CO.

4638 LEXINGTON ST., CHICAGO 44, ILLINOIS

Also sole manufacturers of Alligator Steel Belt Lacing for flat transmission belts. Alligator V-belt Fasteners for V-belts and Flexco HD Belt Fasteners and Rip Plates for fastening and repairing conveyor belts.

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The Standard for Over Forty Years

Can Be Operated By Unskilled Labor

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THESE books explain what a man must know in order to become a mine inspector, a mine foreman, assistant foreman, fireboss, hoisting engineer, safety engineer, shot-firer, etc.

They give you complete and authoritative information about air and gases, explosives, safety requirements and methods, mechanics, engines, hoisting, drainage, pumping, ventilation, timbering, instruments, and every other detail that the practical mining man must know.

Can you answer these questions—

What is meant by splitting the air current and what are the advantages derived from such methods?

Can a miner live in air in which the oxygen content is reduced to 17 per cent?

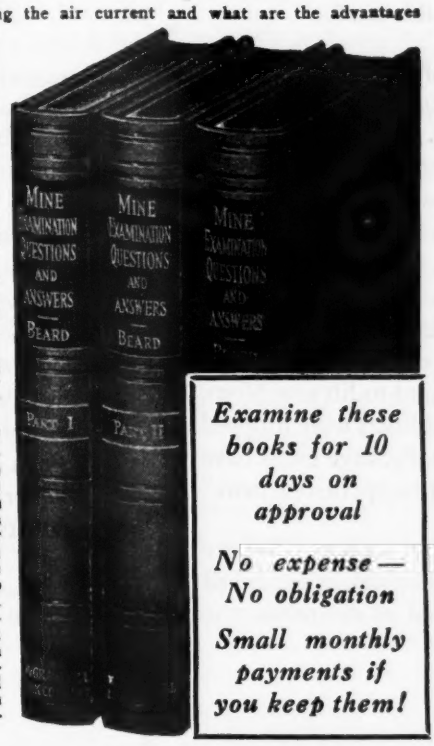
Name five duties imposed on mine foremen by law?

In what time can an engine of 40 effective hp. pump 4,000 cu. ft. of water from a shaft 360 feet deep?

What are the advantages and disadvantages of a gasoline pump, an oil pump and an electrical pump?

What is the estimated tonnage per acre, per foot of thickness, for bituminous coal?

These are but a few of the more than 2000 questions given in Beard's books together with full correct answers. Hundreds of men have used this method to prepare for higher, better jobs. You can too, if you have the Beard books and plan to use them systematically. They are the best investment that a mining man can make—not only as an aid for passing examinations but as practical reference volumes on everyday mining operation problems.



Examine these books for 10 days on approval

No expense — No obligation

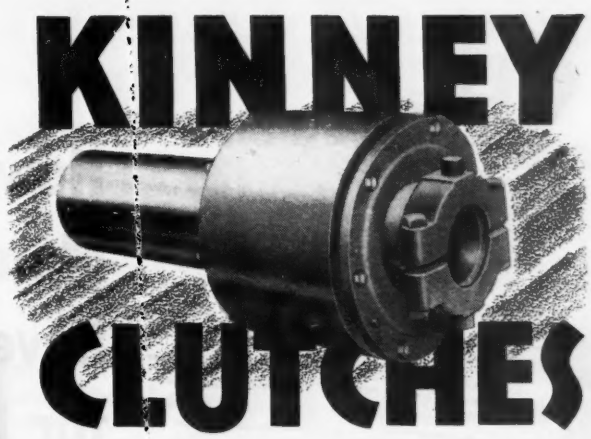
Small monthly payments if you keep them!

McGRAW-HILL ON-APPROVAL COUPON

McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y.
Send me, charges prepaid, **Beard's Mine Examination Questions and Answers**, 3 volumes, for 10 days examination. If satisfactory I will pay $7.50 at the rate of $1.50 in ten days and $2.00 per month. If not wanted I will return the three volumes postpaid.

Name .....
Address .....
City and State .....
Company .....
Position ..... C. 2-45

KINNEY CLUTCHES



Smooth Positive Action

Kinney Clutches are giving unfailing service on thousands of installations. Designed for power take off on high or low speed engines, for driving winch equipment, air compressors, generators or pumps. Available in open arm and totally enclosed types for all services.

Write for Bulletin K-8

KINNEY MANUFACTURING CO.

3525 Washington St. Boston 30, Mass.

New York Chicago Philadelphia Los Angeles San Francisco

We also manufacture Vacuum Pumps, Liquid Pumps and Bituminous Distributors.

Dustproof and Freezeproof your Coal with Dowflake TODAY so you will get your share of Business TOMORROW when Coal must compete with other fuels!

THE DOW CHEMICAL COMPANY

MIDLAND MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland
Detroit • Chicago • St. Louis • Houston • San Francisco
Los Angeles • Seattle

DOWFLAKE CALCIUM CHLORIDE 77-80%

How Four Leading Manufacturers are Helping Save Precious Paper for Uncle Sam

A BIG OIL COMPANY—"In 1943 we reduced the number of issues of our house publication from 12 to 6. Our employe house organ was reduced in size as were our dealer window displays, and all promotional material was kept to the smallest possible size."

A BIG DRUG COMPANY—"The weight of our corrugated board was reduced to the minimum necessary for protection to our goods in transit. The weight of board used on some items was cut almost in half. We increased the pack per shipping case on many items where doubling of the quantity in each case would not result in an unwieldy or hard-to-lift unit. Nests, partitions and liners were dropped right and left. Package insets have been dropped except on one item."

A BIG CHEMICAL COMPANY—"Where 100-pound basic-weight paper had been specified as desirable, the lightest practical weight is now used. All pieces and forms are carefully checked for reduction to next standard smaller size, excessive margins, and number of pages or parts. The Company has adopted single typewriter spacing where practical, typing on both sides of the sheets, pruning lists, and all such miscellaneous practices. Wastepaper at our plants and offices is not burned but baled to reach paper mills for conversion."

ANOTHER BIG DRUG COMPANY—"In 1943 we stopped issuing an almanac. We had been sending out around twenty million. We also discontinued our small booklets, the edition of which was some thirty to thirty-five millions. For 1944 we kept the ban on booklets and also cut out the printing of twenty million calendars."

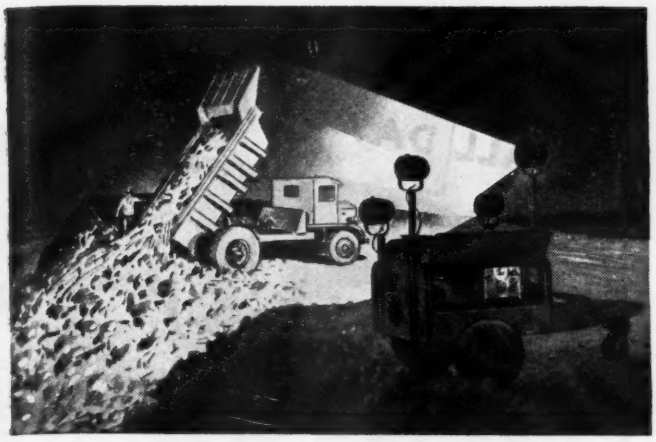
These quotations are from reports to the A. N. A. Paper Committee

Remember—

PAPER IS WAR POWER

USE LESS PAPER — SAVE ALL WASTEPAPER

This advertisement contributed by this publication and prepared by the War Advertising Council in cooperation with the War Production Board and the Office of War Information.



SPEED UP NIGHT OPERATIONS *SAFELY*

***with the* NITE-HAWK**

320,000 CANDLE POWER OF LIGHT

Self-generating, portable, the Nite-Hawk is ideal for lighting up waste dumps and other night operations. Its four 1,000 watt wide-angle floodlights may be adjusted up or down and in all directions — removable, too, for work away from unit. Also provides power for operating electric hand tools and emergency operation of pumps, ventilating equipment, etc. Write for Bulletin NH5E.

NITE HAWK *Lister-Blackstone* INCORPORATED 1706 SO. 68TH ST., MILWAUKEE 14, WIS.

MFRS. OF PORTABLE NITE-HAWK AERO-STARTERS, SEARCHLIGHT AND FLOODLIGHT UNITS

ALSO DIESEL ENGINES AND DIESEL-ELECTRIC POWER PLANTS

GRUENDLER CRAFTSMANSHIP

Serving Industry over 50 Years

Master Builders of Coal Reduction and Sizing Equipment

Ring Hammer Primary Crusher with patented tramp-metal catcher.

For uniform coal sizes Lump, Egg, Nut, or Stoker

Primary crushing of Bituminous mine run coal to 4" minus, capacity 5 Tons per hour, with the Gruendler Ring Hammer Crusher.

WRITE FOR DATA

Allow our Engineers to furnish you, without obligation, Blue Prints and Specifications on Crushing and Screening Equipment for— MINES — BY-PRODUCT COKE PLANTS AND BRIQUET MANUFACTURERS

Refer also to Coal Mining Catalog

GRUENDLER

CRUSHER *and* PULVERIZER CO.

2915-17 North Market St., ST. LOUIS (6), MO.

National

CLASSIFIED ADVERTISING

for bringing business needs or opportunities to the attention of men associated in administrative, executive, management, sales and responsible technical, engineering and operating capacities with the industries served by

The SEARCHLIGHT SECTIONS of

Air Transport
American Machinist
Aviation
Aviation News
Bus Transportation
Business Week
Chemical and Metallurgical Engineering
Coal Age
Construction Methods
Electrical Contracting
Electrical Merchandising
Electrical World
Electronics
Engineering News-Record
Engineering and Mining Journal
E & M J Markets
Factory Management and Maintenance
Food Industries
Power
Product Engineering
Textile World

For advertising rates or other information address:
Departmental Staff

McGRAW-HILL PUBLISHING CO., INC.
330 W. 42nd St., New York 18, N. Y.

KEEP TOOLS SHARP with QUEEN CITY Low-Cost GRINDERS

It takes a top-quality grinder to stand up under the heavy work that pours through a mine maintenance shop. Queen City Grinders are noted for their durability, freedom from downtime, and dependable performance.

Illustrated is the 5 H.P. Heavy Duty Queen City Floor Grinder (No. 11-F), equally adaptable to fine or heavy work. Has numerous safety and operating features. Send for catalog complete with prices and details.

QUEEN CITY MACHINE TOOL CO.

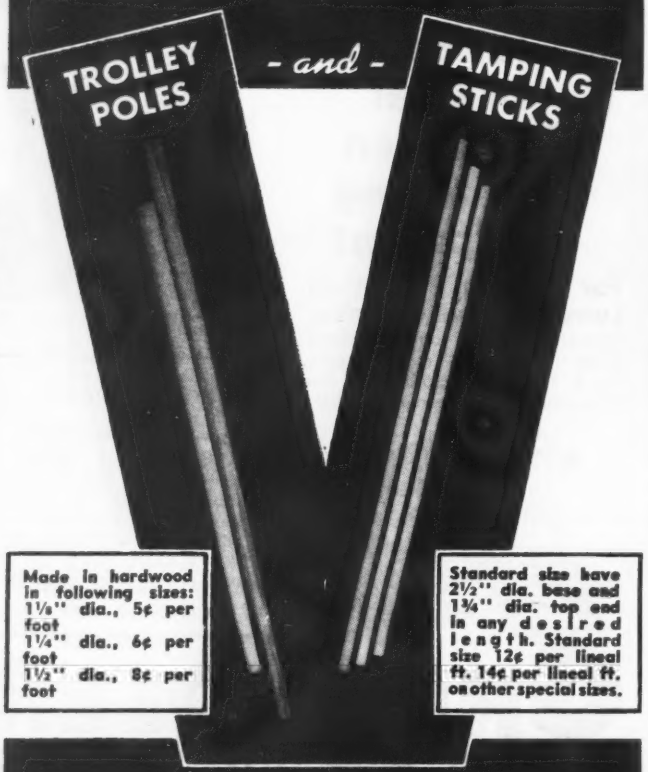
215 E. 2nd St.

Cincinnati 2, Ohio

Agents in Principal cities

PROMPT DELIVERIES

TROLLEY POLES - and - TAMPING STICKS



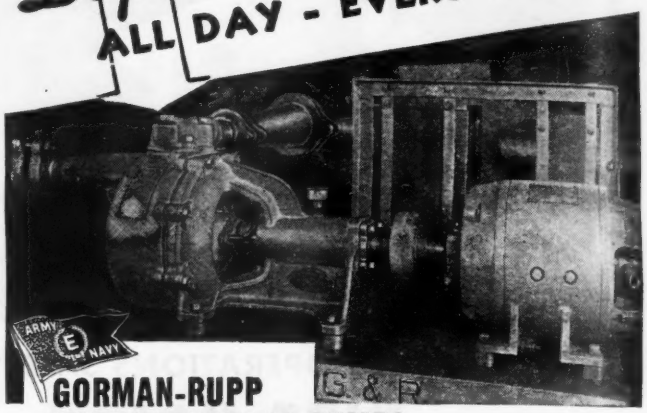
Made in hardwood in following sizes:
1⅛" dia., 5¢ per foot
1¼" dia., 6¢ per foot
1½" dia., 8¢ per foot

Standard size have 2½" dia. base and 1¾" dia. top end in any desired length. Standard size 12¢ per lineal ft. 14¢ per lineal ft. on other special sizes.

WRITE FOR CATALOG NO. 10

J.V. HAMMOND SPANGLER, PENNA.

Dependable ALL DAY - EVERY DAY



GORMAN-RUPP MINE GATHERING PUMPS will run 24 hours a day—every day—without shut-downs. Here is why: The impeller is the only moving part and its wear is negligible. It operates at motor speed, thus eliminating all reduction gearing. Since Gorman-Rupp centrifugal pumps are self-priming, they don't even require priming equipment. There are no pistons, valves, cams — nothing to wear or make trouble. Capacities up to 220 GPM, at 125-foot head. Where pumps must operate reliably with infrequent attention, you can install Gorman-Rupp pumps with confidence. Designed for easy replacement of parts. Write for your copy of descriptive bulletin MP-2.

THE GORMAN-RUPP CO., MANSFIELD, OHIO

GORMAN-RUPP
SELF-PRIMING CENTRIFUGAL PUMPS

ONLY

RUBEROID

Insulating Tape has all these 7 Features

1 Double grip . . . both sides adhesive.
2 Great tensile strength . . . tough.
3 Won't tear, ravel or pucker.
4 Resists abrasion.
5 Acid- and alkali-proof.
6 Extra thick . . . one layer insulates.
7 Exceeds A.S.T.M. specifications by 300% in adhesiveness, 26% in tensile strength, 290% in dielectric strength.

RUBEROID

INSULATING TAPE

The RUBEROID Co., Executive Offices, 500 Fifth Avenue, New York 18, N. Y.

PERFORATED METAL
COAL MINING SCREENS

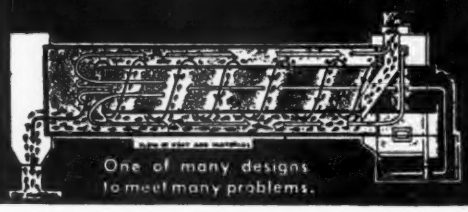
Manufactured exactly to your specifications.
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.

CHICAGO PERFORATING CO.
2443 West 24th Place
CHICAGO, ILLINOIS
Canal 1459

Benefit by the many years of experience in designing and manufacturing of

The L.R. CHRISTIE CO.

17 E. 42nd Street
New York 17, N.Y.



One of many designs to meet many problems.

Dryers
Calciners
Coolers

CONGRATULATIONS...

ON BOTH YOUR FINE WORK AND FORESIGHT ON THE PAYROLL SAVINGS PLAN!

IN your wholehearted support of the Payroll Savings Plan, you are doing far more than backing the most valid system of war financing—and building a powerful dam against the onrush of dangerous inflationary dollars.

By encouraging the all-out participation of your employees in this greatest of all savings plans, you are helping to create a sound economy for post war days.

With this same plan, you are assisting working America to build a mainstay against the inroads of unemployment and want—to save for homes, educational advantages and old age comforts!

You and your employees, through *mutual* cooperation in this forward-looking plan, are gaining a new and closer understanding—the cornerstone of a firmer, *mutually* profitable relationship!

National benefits, too, follow the "All Out" effort you are making! The prosperity of our United States rests on the economic stability of both management and labor. Your Payroll Savings Plan is working constructively toward the assurance of both!

The Treasury Department acknowledges with appreciation the publication of this message by

Coal Age

★ *This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council* ★

WOOD PIPE for Mine Drainage

Wyckoff Wood Pipe has a 90 year record of perfect resistance to the corrosive action of sulphurous mine water. It is an ideal, long-time investment—light, easy to lay, and relatively low in first cost.

We also manufacture a special Hard Maple Pipe for flushing culm in the Anthracite Region and wood covering for underground steam lines.

Established 1855

Shipments from stock day after receipt of order. Send for catalog.

Emergency orders can be delivered by truck to mines in Pennsylvania coal fields following morning after receipt of same.

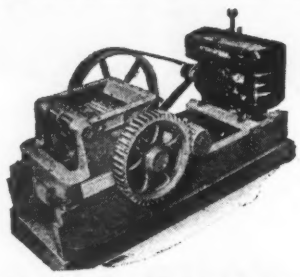
A. WYCKOFF & SON CO.

Office and Factory

No. 35 Home Street, Elmira, N. Y.

The Originators of Machine Made Wood Pipe

"BANTAM-BUSTER" COAL CRUSHERS

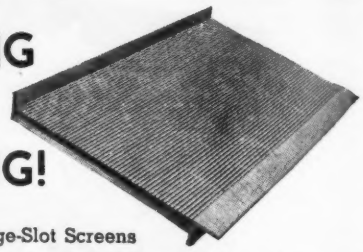


McLANAHAN BUILDS A TYPE AND SIZE FOR EVERY COAL CRUSHING REQUIREMENT! WRITE FOR DATA.

McLANAHAN AND STONE CORPORATION

ESTABLISHED 1835 HOLLIDAYSBURG, PENNA.

SPEED SIZING AND DEWATERING!



Profiles in Hendrick Wedge-Slot Screens have an opening enlarging *downward*, permitting moisture and undersize particles to clear quickly. No blinding or packing! Deep profile bars increase bearing strength — and rigidity. Write for data on Hendrick Profile Bar Screen — "with continuous slots."

HENDRICK MANUFACTURING CO.

64 DUNDAFF ST. CARBONDALE, PA.

Sales Offices in Principal Cities

POSITION VACANT

WANTED: MECHANIC-electrician for operation and maintenance work around coal mining plant near Birmingham, Alabama. Write full particulars as to experience, age, size of family, and starting salary expected. P-288, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

POSITIONS WANTED

MINE SAFETY WORK—The "know-how" acquired in over 15 years work in coal mines on safety, first-aid and rescue work is available in the services of the advertiser (age 32) who, while practically without sight, is thoroughly capable of planning and supervising mine safety work in all its applications. Hold permanent U. S. Bureau of Mines certificate as instructor. Well and favorably known throughout W. Va. and Ky. mining areas. In previous employment with one nationally known producer over six million tons were mined without a fatality. Instruction groups included miners, bus drivers, teachers and junior organizations. Excellent health. Prepared to go anywhere and demonstrate effective work. PW-292, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

ENGINEER-SUPERINTENDENT, thirty years experience bituminous coal mining and construction. Chains, shakers, belts. Now employed. Available thirty days. PW-293, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

ENGINEER OR SUPT. College educated, 48 years of age, 25 years experience in all phases of mining engineering and supervision (from section foreman to Supt.), both in open pit (with the larger type of mechanical equipment) and both high and low coal underground with all types of mechanical equipment. PW-294, Coal Age, 330 W. 42nd St., New York 18, N. Y.

BUSINESS OPPORTUNITIES

FOR SALE Virgin Coal Field, 8984 acres undeveloped. Pittsburgh seam; located in Wetzel Co., W. Va. at Littleton, on B. and O. R.R. Near Green Co., Penna. A state line. R. J. McGee, Secretary & Treas., 340 Braddock Avenue, Uniontown, Pa.

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT: BUSINESS: **"OPPORTUNITIES"** :EQUIPMENT :USED OR RESALE

UNDISPLAYED —RATES— **DISPLAYED**

(Not available for equipment advertising)
10 CENTS A WORD. MINIMUM CHARGE $2.00.
Positions Wanted (full or part time individual salaried employment only), ½ the above rates payable in advance.
Box Numbers—Care of publication New York, Chicago or San Francisco offices count as 10 words.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Individual Spaces with border rules for prominent display of advertisements.

The advertising rate is $6.30 for inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on one column. 3 columns—30 inches—to a page.

NEW ADVERTISEMENTS received by March 1st will appear in the March issue subject to limitations of space available. C.A.

CHEMISTS ENGINEERS PHYSICISTS

Men interested in careers in industrial research are urged to write us giving details of training and experience—Essential work with promising postwar future offering opportunities for professional growth.

Battelle Memorial Institute

Columbus 1, Ohio

PREPARATION PLANT, etc.

Tipple, washery including shakers, tables, booms, crushers, vibrators, retarders, etc. making seven sizes also railroad tracks, scale, machine shop, supplies etc. Good for strip or deep mine. Will sell, lease or invest.

BO-291, Coal Age
520 N. Mich. Ave., Chicago 11, Ill.

AIR COMPRESSOR WANTED

Will Pay Cash for 2600 Ft. Cap. or 2—900 to 1300 Ft. Electric or Diesel Driven Air Compressors.

W-290, Coal Age
330 West 42nd St., New York 18, N. Y.

Vulcan 18-ton steam S/T locomotive, 42" gauge.
Davenport, Porter, Vulcan 17 to 19-ton steam 36" gauge S/T locomotives, (4), rebuilt, tested.
Porter 52-ton steam S/T locomotives, std. ga.
Plymouth and Milwaukee gas locomotives, 8, 12, 25 tons, 36" & standard gauge, A-1.
Bucyrus 50B, 80B steam, & 120B elec. shovels.
Monighan Walker draglines, 3-yd., Diesel, elec.
Page No. 411 Diesel 2-yd. dragline, 65' boom.
Euclid 6-yd. bottom dump crawler wagons (8).

H. Y. SMITH CO., Milwaukee 2, Wis.

When you land a big stripping contract, it pays you to cover it with shovels and draglines that will *keep pace* with your hauling work. Whether you need the LARGEST or SMALLEST equipment, we can meet your needs.

Many of the machines we offer are convertible and have both dragline and shovel equipment, ready to work either way, at once.

ECONOMY COMPANY gathers equipment from Coast to Coast—so we can offer a good assortment of sizes and models of shovels, draglines and auxiliary equipment always on hand, ready to go on your job. Call on us also for hauling equipment—all sizes of Trucks and Tractors.

WIRE, PHONE OR WRITE FOR AN INSPECTION.

2½ YD. DIESEL SHOVEL AND DRAGLINE COMBINATION

2—Exceptionally desirable 48B Bucyrus-Erie units will be released toward the end of February. Complete shovel attachment—60' dragline boom—2½ yd. dragline bucket—Buda 6-cylinder Diesel Engine. Will be loaded on cars. Price only $21,400 each.

STEAM SHOVELS AND CRANES

8 yd. Bucyrus-Erie Class 230 Dragline—175' Boom. 6-8 yd. buckets. A real buy. Located Mississippi.

6 yd. Bucyrus-Erie Model 220B stripping shovel—80' shovel boom—54' dipper stick.

4 yd. Monighan Dragline with 100' Boom. A real buy. $7600.

3½ yd. Marion Steam Shovel—65' Boom—40' Dipper Stick can be purchased for a fraction of its real value.

3½ yd. 175B Bucyrus Shovel with 75' shovel boom, 48' dipper Stick. $20,000 has been spent on rebuilding the machine. A real buy for $14,500.

In addition to these steam shovels and cranes we can offer a great many larger shovels as well as ¾ yd., 1 yd., 1½ yd., 1¾ yd. and 2 yd. machines.

Let us know by phone, wire or mail what size machine you require and we will send to you, immediately, a detailed proposal and will gladly arrange for inspection.

TRUCKS

23 YD. DUMP TRUCKS

Sixteen—*White* Rear End Dump Trucks can be purchased extremely reasonable.

14 YD. "EARTH MOVERS" OSHKOSH TRACTOR WAGONS

We can offer three of these units in exceptionally good condition and reasonably priced.

Two *Euclid* Diesel End Dump Trucks—10 to 12 yd. capacity.

Six—1942 and 1943 *Euclid* Diesel Dump Trucks of 10 to 12 yds.

Two—12 yd. *International* Dump Trucks.

2 YD. HI-LIFT DIESEL STRIPPING SHOVEL

Model 906 Osgood with Hesselman semi-diesel engine—35' shovel boom—32' dipper stick—Rebuilt and Guaranteed. Ready for immediate delivery.

5—6 YD. DIESEL MONIGHAN 5W DRAGLINE

110' Boom—5 and 6 yd. dragline buckets. Exceptionally good condition. If interested we recommend immediate action as a machine of this type will not remain in the market very long.

1943—5 YD. SHOVEL

This 5 yd. shovel was released from the factory in July 1943, and naturally, is in exceptionally good condition. The shovel boom is 34' long—the dipper stick 22'6". This machine is electrically driven and powered by Westinghouse Motors. Standard guarantee goes with the machine.

4 YD. SHOVEL AND DRAGLINE

100B Bucyrus combination shovel and dragline with 4 cu. yd. dipper bucket and 4 cu. yd. dragline bucket—105' dragline boom in four sections. Westinghouse Electric Motors. An exceptionally good buy for $44,000.

Four *Euclid* Gas Bottom Dump Trucks—8 to 10 yds.

Five—9 to 11 yd. *Euclid* Diesel Bottom Dump Trucks.

Three—10 yd. *Euclid* Diesel Bottom Dump Trucks at an exceptionally low price.

Two—8 yd. *Sterling* Dump Trucks.

Four—5 yd. *Sterling* Dump Trucks.

Sixteen—*International* Dump Trucks 6-10 yd. capacity.

It is impossible to supply complete information regarding the above listed dump trucks and a great many others anywhere from 1½ tons to 10 tons.

We suggest you write, wire or phone for detailed information, stating your requirements.

4—5 YD. ELECTRIC SHOVEL AND DRAGLINE COMBINATION

2—Bucyrus-Erie 120B Shovels with 80' dragline booms—4 yd. and 5 yd. dragline buckets. Ready for immediate delivery.

7 YD. BUCYRUS-ERIE 175B ELECTRIC SHOVEL

65' Shovel boom—42' Dipper Stick. In good operating condition.

ECONOMY COMPANY, INC.

49 Vanderbilt Ave., N. Y. C. **Tels. MUrray Hill 4-2294-8292-2295-2296**

LOCOMOTIVES

Goodman: All 250 volts.
1—10 ton, 31-1-4-T.
1— 6 ton, 30B, 43" 1—5 ton.
1— 5 ton, W-1-2, 36".
2— 5 ton, 2600 K.
1— 6 ton, 32-1-4-T.
2— 8 ton 32-1-4-T.

Westinghouse: All 250 volt.
1—4 ton, 902. 48" 1—12 ton, 102, 42"
1—904 c. 44" 500 volt. Also 906 motors.
1—10 ton, 915.
Bar steel frames 10 ton, 6 ton, and 4 ton.

G.E.: All 250 volt. 4 ton 1022, 44" as is
6 ton 803, 44", as is 5 ton 825, 44"
6 ton 823, 44" 8 ton 839 motors
6 ton 801
8 ton 839
Battery Locomotives GE., Ironton and Atlas:

Jeffrey: 6 ton, and 4 ton, all gauges, 250 volt
1—Jeffrey MH 100, frame only.

MINING MACHINES

Jeffrey, 35B and 4—28A, 250 V. 4—29B, 29C, 29CE with shearing head.

Goodman, 12A, 12AB, 12AA, 12G3A, 24B
1—12G3 250 volt and 2—112 DA, 500 volt.
2—Permissible Type 12CA. 6—112AA,
2—124EJ.

Sullivan, CE7, CE9, CE10, CR10 Low Vein. CR5 for middle cutting.

SUBSTATIONS—275 volts, D. C.

2—200 KW G.E. Rotaries (600 volt).
2—150 KW West. Rotary.
1—200 KW 1—100 KW Ridgway M-G Sets
2—100 KW G.E. Rotary.
1—100 KW Allis-Chalmers Rotary.

SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73, 29B, 35B and 28A. Goodman 34B, 30B, 30C, 12A, 12AB, 12AA 33-1-4-T, 31-1-4-T. General Electric 801, 803, 819, 821, 825, 839. Westinghouse 904, 906, 102, 907, YR2, 115. Also 200 KW Westinghouse Rotary Converter Armature, 250 V. Bracket Type, 150 KW G.E. HCC Bracket Type, and 150 KW G. E., TC Pedestal Type.

AERIAL TRAMWAYS * HOISTS * PUMPS * MOTORS * TRANSFORMERS * BOND WELDERS * RESISTANCE * COMPRESSORS * DUMPS * SPEED REDUCERS FIELD FRAMES * ARMATURES * GOODMAN HYDRAULIC SHOVELS * MOTOR STARTERS AND CONTROLLERS—AC & DC * DROP BAR SUPPORTS (Gooseneck). 29B and 29C * MINING MACHINE TRUCKS * SWITCHBOARDS * CIRCUIT BREAKERS—AC & DC * CONVEYOR HOISTS * COAL CRUSHERS (double roll) 12"x16", single roll 24"x36", 24"x24" * ROPE & BUTTON CONVEYOR 400' long LATHES, SHAPERS * SWITCHES * AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amps to 2000 amps * MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps * HOISTS, overhead, AC. 3-60-440, 1 ton and 2 ton * 1 clam shell bucket 1¾ cubic yard. 1—Figure 8 drum * MINE CARS * 2 SULLIVAN BIT SHARPENERS * R.R. SWITCHES 85# to 100# HOISTS 5 HP AC and DC GENERATORS DC 250-275 volt, 30 KW to 100 KW. Also 50 KW 125 volt direct connected to steam engine. Goodman Scraper Loader.

GUYAN MACHINERY COMPANY, Logan, W. Va.

★ MINING EQUIPMENT READY FOR DELIVERY ★

GENERATORS

1—100-KW. G.E. type TC-6 Rotary converter complete with 2300 volt transformers and complete switchboard equipment, 250 volt D.C.
1—100-KW. Westinghouse, type SK-180, 250 volt generator complete with switchboard.
1—62½ KVA. 220 volt A.C. generator complete with switchboard and direct connected to 100-HP. Natural gas engine.

LOCOMOTIVES
All 250 V

1—5-Ton Goodman, type 8-A, 42" gage, with motor driven cable reel.
1—6-Ton Goodman, type 30-C, 44" gage, with motor driven cable reel.
1—8-Ton Westinghouse, type 65, 44" gage.
1—8-Ton Jeffrey, type MH-100, 36 to 44" gage.

CUTTING MACHINES

1—35-HP. Goodman standard with low vein truck, 250 or 500 volt.
1—35-A Jeffrey, 250 volt less truck.

MISCELLANEOUS

250—44" gage mine cars, 3-ton capacity, end dump.
1—Rope & Button conveyor outfit, 1" rope, 12" buttons.
1—Figure 8 Incline rope drum grooved for 1" rope.
2—Steel loading booms 42" wide, 38' long with 12' picking tables.
1—Belt conveyor 24" wide, 40' long (self contained).
1—5 x 8' Fairmont vibrating screen (double deck).

ALL-STATE EQUIPMENT CO.
LOGAN, W. VA.

ELECTRIC LOCOMOTIVES

1—10 Ton GE steel frame, 250 V., HM-830-A motors.
1—8 Ton Jeffrey steel frame, 250 V.
1—8 Ton Goodman, steel frame, 250 V., Type 3104-T, 42" track gauge.
1—6 Ton West. bar steel frame with 904-C, 250 V. motors.
1—5 Ton GE ready to operate, 42" gauge.
2—5 Ton Goodman 250 V., 36" gauge.
1—4 Ton Jeffrey MH-96, 250 V.

COAL CUTTING MACHINES

1—124EJ Goodman, 50 HP, 250 V., permissible track mounted slabbing machine.
1—35B Jeffrey 250 V shortwall.
1—35BB Jeffrey AC shortwall.
1—35B Jeffrey 500 V shortwall.
1—12DA Goodman, 50 HP, 250 V DC.
1—12G3 Goodman, shortwall, 3/60/220 V. AC.
1—12AB Goodman shortwall, 250 V., DC.
1—36B Jeffrey, 250 V. longwall.

MG SETS AND ROTARIES

1—100 KW Rotary Converter, 275 V., DC.
1—D-13000 Caterpillar Diesel Engine Coupled to 100 KW 275 V., DC Generator.
1—165 HP GE Syn. 2200 V., 900 RPM motor, 100 KW, 250 V., DC.
1—150 KW GE type HCC form P, 275 V., Rotary Converter complete.

Send us a list of any equipment you may have for sale.

TIPPINS MACHINERY CO.
Pittsburgh 13 Pennsylvania

-TRANSFORMERS-

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We have several thousand transformers in stock for prompt shipment, and invite your inquiries.

PIONEER TRANSFORMER REBUILDERS

We rewind, repair and redesign all makes and sizes.

One Year Guarantee

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
STATION M Since 1912 CINCINNATI 27, OHIO

MINE HOISTS

1—Vulcan Keyed drum 30" dia. Will coil 2500 ft. ¾" rope. 50 HP Motor.
1—Vulcan Band friction 42" dia. Will coil 3000 ft. 1" rope. 100 HP Motor.
1—Flory Keyed drum 52" dia. with 150 HP Motor.
1—Vulcan Man Hoist, 72" dia. Suitable 300 ft. shaft. Motor to suit conditions.
1—Nordberg Shaft Hoist, 72" dia. 150 HP Motor.
1—Vulcan Cylindro Conical Shaft Hoist. 7'-9"—350 ft. wire rope. 400 HP Electrical Equipment.
1—Lidgerwood Two-Drum tail rope haulage hoist. Will coil 9000 ft. 1" rope. 300 HP Motor.
1—Ottumwa haulage hoist, 34" dia. Will coil 10,000 ft. ⅞" rope. 400 HP Motor.

And other hoists to suit all mining conditions.

Jones Mining Equipment Co.
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PITTSBURGH · CHICAGO · NEW YORK

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CHARLESTON WEST VIRGINIA

RAILS—CARS

All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches and ties.

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MOTOR GENERATOR SETS

1—100 kw. 250/275 v. DC G.E. Gen. dir. driven thru coupling by 1—150 HP 2200 v. 900 rpm G.E. Syn. Motor.

1—200 kw. West. 600 v. DC 900 rpm Gen. direct driven through common shaft by 1—290 HP 440 v. 3 ph. 60 cy. West. Syn. Motor.

ROTARY CONVERTERS

3—150 kw. West. 3 ph. 60 cy. 275 v. 1200 rpm. Rotary Converters comp. with transformers, switchboard.

3—300 kw. West. 3 ph. 60 cy. 600 v. 1200 rpm. Rotary Converters comp. with transformers, switchboard.

DIESEL ENGINE GENERATOR SET

1—150 kw. 250 v. 200 rpm cp. wd. Cr. Wh. Gen. dir. conn. to 260 HP 200 rpm 2 cyl. Buckeye Diesel Engine.

MINING MACHINES—250 v. DC

1—CE-7 Sullivan 36" ga.

1—Armature for CE-7 Sullivan 250 v. DC.

MINE LOCOMOTIVES

3—5 ton Goodman 30 B 250 v. 36" ga.

1—5 ton Goodman 2600R Gathering Locomotive. 250 v. DC 42 or 44" ga. with cable reel.

1—10 ton West. 500 v. 40" ga.

1—10 ton Goodman Haulage or Gathering Locomotive, 250 v. 42" ga. Inside wheels.

1—13 ton Westinghouse 42" ga. 250 v. Locomotive, two motor type; single end control.

PUMPS

1—American Piston Pump, intake 5½", discharge 4½", size 8x12.

SLIPRING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
300	G.E.	I	440	900
260	Burke	EMV-65	440	600
150	West.	CW	220/440	490
150/75	West.	CW	220/440/2200	580/290
100	West.	CW	220/440	685
75	G.E.	I-M	440	1200
75	West.	CW	220/440/2200	580/290
50	Chand.		220/440	1800
50	Allis Chal.		220	490
20	Westg.	CW	220	1735
15	Westg.	CW	220	870

230 V. DC Motors

2—250 HP 220 rpm. type MP General Electric Motors.

HP	Make	RPM	Type
1	Louis Allis	1150	INA
1½	Westg.	2200	SK
1½	Westg.	1000	CD
1½	Westg.	900	SK
1½	Robbins Myers	1750	
2	Thompson	1100	
2	Northern	1000	
4	Westg.	1180	
4	Cr. Wh.	1170	CM
5	Cr. Wh.	960	CCM
5	Cr. Wh.	980	CM
5	Imperial	540	SK
5	Westg.	850	
5	Westg.	1600	RC
7½	Cr. Wh.	875	
7½	Cr. Wh.	940	CCM
10	West.	1325	S
10	Cr. Wh.	875	
10	Cr. Wh.	825	CM
10	Cr. Wh.	675	CCM
15	G.E.	850	RC
15½	West.	965	S
35	G.E.	900	DLC

TRANSFORMERS—1 ph. 60 cy.

No.	Kva	Pri.	Sec.	Make
1	2	6600	110/220	G.E.
3	5	2300	220/440	G.E.
1	5	550	110	Pgh.
1	5	2200	110/220	West.
84	7½	2200	220/110	G.E.
32	7½	2200	220/110	West.
12	10	2200	220/110	West.
13	10	2200	220/110	G.E.
2	15	400/30000/50000		American
1	25	2200	220/110	G.E.
6	35	220	110	West.
3	37½	2200	440/220	West.
3	50	6600	575/440/220	G.E.
2	50	6600	550/440	Pgh.
2	50	6600	550/440	Al. Ch.
6	73	2200/4000	220/110	West.
6	73	440	205	West.
1	75	2200	220	Burke
6	75	2200	220/440	West.
3	150	2400	220/440	Allis Chal.

AUTOMATIC RECLOSING CIRCUIT BREAKERS

1—300 Amp. 275 volts, type RBI, serial No. 6193.
1—400 Amp. 275 volt, type CRL, serial No. 6327.
1—400 Amp. 275 volt, type ARL, serial No. 7536.
1—600 Amp. Class I, type AHD, 275 v. Ser. No. 8651.

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH (6), PA.

ROTARY CONVERTERS

500 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200 RPM. Pedestal Type, 2300/4000 V., Transformers.

500 KW WEST. SYN 275 V. 6 Ph., 60 Cy., 1200 RPM. Pedestal Type, 2300/4000 V., Transformers.

300 KW G.E. SYN 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.

150 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM. Bracket Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

500 KW WEST. SYN. 275 V. 2300 V., 3 Ph., 60 Cy., 900 RPM. Manual Switchgear.

200 KW G.E. IND. 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM. Manual Switchgear.

LOCOMOTIVES

13-T WESTGHE., 250 V. 908-C Mts., 36"-48" Ga.
13-T GOODMAN, 250 V., 36-A Mts., 36"-42" Ga.
10-T WESTGHE., 250 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHE., 500 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHE., 250 V., 906-C Mts., 36"-44" Ga.
8-T WESTGHE., 500 V., 906-C Mts., 36"-42" Ga.
8-T GEN. ELEC., 250 V., 839 Mts., 36"-48" Ga.
6-T WESTGHE., 250 V., 904-R4 Mts., 36"-48" Ga.
6-T GEN. ELEC., 250 V., 823-A Mts., 36"-42" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK COMPANY
Incorporated
501 Grant Building Pittsburgh, Pa.

FOR SALE

Frank J. Wolfe

LOCOMOTIVES

8—6-ton General Electric Locomotives, types 801, 819, 821, 823, 250 volt B. B. motors, with reels and cable.

8—8-ton Goodman Locomotives, type 32-0-4-T, 250 volt B. B. motors.

4—8-ton General Electric, type HM-819, 250 volt B. B. motors.

4—6-ton Westinghouse, type 904, 250 volt B. B. motors.

CUTTING MACHINES

8—29-C Jeffrey Bottom Cutters, 250 volt DC.
3—Sullivan CLU, 250 volt DC.
3—Jeffrey 35-BB, 250 volt DC.

LOADING MACHINES

2—260-A Goodman, 3 phase, 60 cycle, 220/440 volt AC.
2—7-BU Joy, 250 volt DC.
6—5-BU Joy, 250 volt DC.

MISCELLANEOUS

2—150 KW General Electric Motor Generator Sets and (1) 150 KW Allis-Chalmers Motor Generator Set, 250/275 volt DC, 1200 RPM, 3 phase, 60 cycle, 2300 volt AC.

We have 4 and 5-track complete steel tipples, electric hoists from 300 to 1500 H.P. for slope, shaft and drift mines.

WE SPECIALIZE IN BUYING COMPLETE MINES THAT ARE GOING OUT OF BUSINESS OR FROM RECEIVERS IN BANKRUPTCY, ADMINISTRATORS OF ESTATES, ETC.

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FOR SALE:

Dragline-Shovel Model 1400 P&H Electric Dragline. 110' boom, 4 yard bucket. Completely rebuilt.

Model 5120 Marion Electric Dragline with 100' boom and 3 yard dragline bucket. Excellent condition.

¾ Yard Osgood Commander Gasoline Shovel. Rebuilt.

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ROCHESTER 1, NEW YORK

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A DEPENDABLE SOURCE
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HEAVY EQUIPMENT

CARS — CRANES — COMPRESSORS
DRAGLINES — LOCOMOTIVES
SHOVELS—TRACTORS—ETC.

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WE WILL FIGURE WITH YOU ON YOUR SURPLUS

B. M. WEISS CO.
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150 KW MOTOR GENERATOR SET

250/275 V. D.C.—3/60/2300 V. A.C.
SK—WESTINGHOUSE—G
ARMATURE REWOUND—ALL REBUILT
COMPLETE PANEL CONTROL

JOHN D. CRAWBUCK CO. PGH. (22) PA.

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48 In. CONVEYOR BELTS

1700 Ft. GOODYEAR 48 In. Wide 8 Ply 36 Oz. ⅛ Top 1/16 Bottom,
Excellent Condition.
IMMEDIATE SHIPMENT

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60 East 42nd St. New York 17, N. Y.

PROMPT SHIPMENT FROM OUR WAREHOUSE

MINING MACHINES

5—12 DA 50 HP 250 v. Goodman Shortwall
35 B Jeffrey 250 v. 6' cutter
12 A Goodman 250 v. 36" Ga. 35 HP

STORAGE BATTERY LOCOMOTIVES

2—6 Ton G.E. Permissible Locomotives 36/44" Ga. O.S. armorplate frame. Inside steel tired wheels. 2-HM 825 Ball Bearing Motors. Type LSBE Class 2C6 From C9. 13½' long, 50" high, 69" wide and 44" Wheel base Each of the above units equipped with Edison Battery 80 cell A-10—one new in 1940, the other in 1939.

1—5 to 5½ Ton Type D Ironton, 36 or 42" Ga. Low Type, with Exide Battery.
1—5 Ton Atlas 40" or 44" Ga. with 2 Ball Bearing Motors. Battery box on top of locomotive.
4 Ton 36" Ga. Atlas, with Exide Battery.
4 Ton 36" G.E. (2 motors), with Exide Battery.

(Haulage)

13 Ton Westgh. 250 V. 36" or 40" Ga.
13 Ton Westgh. 500 v. 40" Ga.
10 Ton Jeffrey 500 v. 36/42" Ga.
6 Ton Baldwin West. 250 v. 36/42" Ga. #48747 904 Motors outside bar steel frame, inside steel tired wheels.
2—6 Ton G.E. 500 v. 42/44" Ga.
2—6 Ton G.E. 250 v. 42/44" Ga.
1—5 Ton West. 250 V. 36 or 42" Ga. with Electric Gathering Reels. Bar steel frame.

SCREENS

2—4' x 5' single deck Tyler Hummer Screens Type 37 equipped with V-16 Vibrators No. 2860 and 2867 designed for 110 v. AC 15 cy.

MG SETS 3 ph., 60 cy. (Syn.)

100 KW Ridg—250 v. DC—2200/3/60 AC 1200 RPM.
100 KW West., 125 v. DC—2200/3/60 AC 1200 RPM
100 KW G.E. 275 v.—220/440/3/60 600 RPM Belted sq. cg.
100 KW G.E. 275 v.—2200/3/60 900 RPM.

ENGINE GENERATOR & TURBINE SETS

100 KW 250 v. DC Westgh.—Skinner Engine.
57.5 KVA Allis Chalmers Gen. 220/3/60—Kerr Turbine.
50 KW West. 125 v. DC—Skinner Engine.

TRANSFORMERS

Qu.	KVA	Pri. V.	Sec. V
31	7½	"	"
28	10	"	"
3	50	22000	2200

CAPACITORS

180 KVA 2200/3/60 Type OH1 3 ph. 60 cy.

DC GENERATORS

2—100 KW G.E. 250 v. 850 RPM Type CL
75 KW G.E. DLC 125 v. 700 RPM.
50 KW West. 250 v. 900 RPM.

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	Wdg.	Type
500	G.E.	450	S.R.	MT 412
200	G.E.	250	S.R.	MT 412
200	G.E.	600	S.R.	I-M
150/75	West.	580/290	S.R.	CW
150	West.	375	S.R.	CW
150(2)	West.	600	S.C.	CCL
125	Al. Ch.	435	S.R.	
100	G.E.	500	S.R.	MI-25 cy.
100	Al. Ch.	575	S.R.	
100	G.E.	1200	S.C.	
100	West.	580	S.C.	C8
75	West.	580	S.R.	CW
75	West.	290	S.R.	CW
50	G.E.	900	S.R.	IM

Other sizes down to 1 HP

DC MOTORS—230 VOLTS

HP	Make	Speed	Wdg.	Type
175	G.E.	475	ser.	MD 109½
100 (1)	G.E.	700	cp. wd.	CL 90
130	G.E.	550	ser.	CO 1812 A
100	G.E.	480	ser.	MD 108½
60	G.E.	600	ser.	CO 2507
50	West.	850	cp. wd.	SK
25	West.	600	cp. wd.	SK 130
25	Reliance	850	cp. wd.	185 T

SYNCHRONOUS MOTORS

HP	Make	Voltage	Speed	Type
200	West.	2200	900	
150	G.E.	2200	900	ATI

Each of the above has a dir. con. exciter.

MOORHEAD-REITMEYER CO., INC. **Pittsburgh 19, Pennsylvania**

Freight Cars of All Kinds

40. Hopper, Triple, 50-Ton
85. Hopper, Side-Discharge, 50-Ton
80. Refrigerator, 40-Ft., 40-Ton
16. Refrigerator, 36-Ft., 30-Ton
8. Ballast, Composite, 50-Ton
29. Box, 36-Ft., 40-Ton
9. Dump Koppel Automatic, 30-Yd.; with aprons. 50-Ton
25. Dump, Western Automatic, 30-Yd., 50-Ton; with aprons.
10. Magor, Automatic, 30-Yd., 50-Ton; lift doors.
10. Western Automatic, 30-Yd., 50-Ton; lift doors.
4. Dump, Western, 20-Yd., 40 & 50-Ton
1. Dump, Koppel, Drop-Door; 20-Yd., 40-Ton
18. Dump, K & J Automatic, 16-Yd., 40-Ton
20. Flat, 40-Ft., 40 and 50-Ton
35. Gondola, Composite, 36-Ft. & 40-Ft., 40 & 50-Ton
6. Gondola, Steel, 50-Ton, High-Side
30. Tank, 8000-Gallon, 40 & 50 Ton

All cars are priced to sell!

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Bucyrus-Erie 48B 2½ yd. Diesel dragline
P & H Model 700 shovel and crane 1½ yd. capacity
Buc.-Erie 42B steam shovel 1½ yds. cap.
Browning 10-12 ton truck crane on Mack truck
Marion 371, 1¾ yard Shovel-Crane-Dragline
P & H 650 Shovel and Crane
Buc. Erie GA-2 Shovel, gas
Bucyrus-Erie 1½ yd. steam shovel and crane
P & H 203A Truck Crane, 8 tons
Bucyrus-Erie 42B 1½ yd. steam shovel and crane
Conway Mucker "75", 36" gauge
2—Conway Muckers "50", 36" ga. rebuilt
Buc. Erie 50B Steam Shovel 2 yds.
Buc-Erie B2 shovel and crane 1 yd. capacity
Koehring 301, ¾ yd. Shovel & Crane
Buc. Erie Steam Dragline, 6-8 yds, 175' bm.
Lorain 75B 1½ yd. shovel-crane
75A Lorain 1¼ yd. shovel-crane
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Freuhauf 50 ton trailer & tractor
Allis-Chalmers Model "L" tractor with Bulldozer
Allis Chalmers HD10 Tractor with bulldozer
Allis Chalmers, "K" Tractor with bulldozer
Int. T35 Tractor with Angledozer
Jaw Crushers: 12x26, 13x30, 14x28, 16x32
Bucket elevator belt type 22" buckets 40 ft. centers
Robbins double roll coal crusher 24"x30"
Mundy 35 H.P. double drum gas Hoist
National 100 H.P. dbl. drum Dragline Hoist, elec.
Baldwin 78 ton Side Tank Locomotive
American 45 ton Saddle Tank Switcher
Vulcan 30 ton Steam, std. gauge Saddle Tank loco.
Vulcan 25 ton Steam Loco. std. ga. side tank
Whitcomb 14 ton 36" gauge Diesel Loco.
Vulcan 6 ton, 36" gauge, gas Locomotive
15—Gondola Cars, 50 tons, steel
Haiss Model 206 wagon loader 3 tons per min.
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Trucks: Mack, Sterling, G.M.C. up to 12 yds.
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Air compressors from 300 to 2000 cu. ft.
Bucket elevator, belt, 22" buckets, 35'
Haiss ¾ yd. Clam. rehandling Bucket
Erie ¾ yd. Clam. rehandling Bucket
Blaw-Knox ⅞ yd. Clam. digging Bucket
Hayward ⅞ yd. Clam. digging Bucket
Allis-Chalmers TD 14 tractor with bulldozer. Rebuilt

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30 Church St. New York 7, N. Y.

Priced low for quick disposal

One Allis Chalmers 150 K.W., 125 - 250 V. Erie Ball D.C.

ENGINE GENERATOR SET

SPECIFICATIONS

Generator	Engine
Serial No. 110332	Serial No. 6440
Amps. 600	Bore & Stroke 16 x 20
R.P.M. 200	Four valve,
Compound Wound	non-releasing

Equipped with Allis Chalmers 13.3 K.V.A., A.C. transformer and panel board.

in good operating condition

KELLY & CO.
2007 Olive St., St. Louis 3, Mo.

FOR SALE

100—Hyatt Roller Bearing Mine Cars, 36" Gage.
2—200 K.W. M.G. Sets, 600 RPM.
4—50 HP Goodman Shortwall Mining Machines.
1—Jeffrey 4-Ton Locomotive with Crab Reel.
3—Jeffrey Aerodyne Blowers with Tubing.
4—Jeffrey A-7 Coal Drills.
2—Chicago Pneumatic Type CP-571 Coal Drills.
1—20 Ton Fairbanks Motor Truck Scale 9'x24'.
2—Deming Fig. 4042, 5" Suction, 4" Discharge Chrome Iron, Centrifugal Side Suction Pumps with Base, Coupling, & 20 HP D.C. Motors.
1—Deming Fig. 696—6x10 Double-acting Piston Pump.
60—Steel Lockers.
1—35' Fairfield Drag Conveyor (new).
300'—No. 2 3-Conductor G.E. Tellurium Rubber Covered 5000 Volt Drill Hole Cable, good as new.

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MINING MACHINES

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REBUILT & GUARANTEED FOR IMMEDIATE SHIPMENT

125 HP. Motor, 220/440 V., 3 Ph., 60 Cy., 1800 RPM, ball bearing; with drum controller and resistance.
Electric Coal Drills, Mine Fans, Triple Scales, etc.

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Equipment of all kinds
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Guaranteed used steel pipe
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Large assortment Mining Cable and Wire, insulated and bare. Bus Bars—12' lengths, ⅛" x 1", 2" & 3" ¼" x 2" & 4". Mica Paper—Micanite #24, .011 thick x 36" wide x 16' long. In original packages. Material in stock. Send inquiries to

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15 ton, 22' x 9' Truck Scale . .	$ 440.00
20 ton, 24' x 10' Truck Scale . .	$ 575.00
20 ton, 34' x 10' Truck Scale . . .	$ 815.00
3 ton tipple scale	$ 135.00
3' x 6' Single Deck Screen . . .	$ 495.00
3' x 8', Double Deck Screen . .	$ 885.00
Double-Roll Coal Crusher	$ 345.00

Immediate Shipments — Terms

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16 YD. DRAGLINE:
1—16 Yd. Electric Caterpillar Modern Dragline with 160' Boom
AIR COMPRESSORS:
(7) Steam 66 ft., 300 ft., 600, 1000 & 1940 ft.
(12) Belted, 360, 676, 870, 1000, 1300 ft.
(13) Diesel 105, 315, 520, 676 & 1000 ft.
(6) Electric, 1300, 1,500, 2200, 2000, 5000 ft.
(14) Gasoline, 10, 160, 220, 210 & 370 ft.
RUBBER CONVEYOR BELTS:
1000' 60", 600' 30", 300'' 20", 1000' 42", 900' 48", 1450' 36", 1200' 24", 900' 18", 600' 16", 350' 14"
TANKS:
12,000 and 15,000 gal. and 20,000 gal.
CONVEYOR PARTS:
Idlers, Heads & Tail Pulleys, Steel Frames, Tripper, etc., 14 In., 48 In. Large stock here.
STORAGE BATTERY LOCOMOTIVES:
2½ ton Whitcomb 24 ga. New Batteries
2—4 ton G.E. 30 in. ga.
3—5 ton Mancha 30 in. ga.
4—5 ton G.E. 36 in. ga.
3—7 ton Goodman 36 ga. Battery & Trolley
3—6 ton Baldwin Westgh. 42 ga. & 36 ga.
TRACK SCALE:
150 Ton Buffalo 56 ft. R.R. Track Scale
TROLLEY LOCOMOTIVES:
3½ ton Westinghouse 24 ga.
1—6 ton & 3—5 ton Goodman 36 ga.
3—6 ton Goodman 30 ga.
4—6 ton Goodman 42 ga.
5—6 ton Westinghouse 42 ga.
3—8 ton Goodman 36 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey
VIBRATING SCREENS:
9 Tyler Hummer 3x6, 4x5, 4x8, 4x10
2 Robins Gyrex 4x8¼
4x12 Niagara, 3x8 L. B., 5x6 Simplex
CARS:
40—Western 16-20-30 yd. Side Dump
SHOVELS, CRANES & DRAGLINES:
2 yd. Monighan 60' Boom Walker
2—1½ Marion Diesel Elec. Shovels
2 yd. P. & H. Model 780 75' Boom Diesel Dragline
2—2¾ yd. 48B Diesel Shovel—Draglines
2 yd. Page 70' Boom Diesel Dragline
1¼ yd. Marion 450 Elec. Shovel
2—120B—4 yd. Elec. Shovel—Dragline
25 ton Browning 50' Boom Loco. Crane
MINE LOADERS:
H23 Sullivan Tunnel Loader
3—5 BU & 7 BU & 12 BU 36 or 42 ga. Joy
7 Conway 20A, 30A, 50A, 60 & 75 Muckers
5—Gardner Denver & Elmco Shovels
MISCELLANEOUS:
5'x60' Traylor Rotary Dryer
Clamshell Buckets ¾, 1, 1¼ & 2 yd. Cap.
30 ton & 12 ton Vulcan St. Ga. Gas. Loco.
WANTED TO BUY:
Complete Mines—M.G. Sets, Locomotives, Compressors, Conveyors, Cranes, Crushers, Mine Loaders

R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

LATHES
24"x18' Lodge & Shipley, M.D.
32" x 20' Boye & Emmes, Cone Drive, Quick change.

RADIAL DRILLS
6' American Triple Purpose, M.D.
6' Cincinnati Bickford Radial M.D.
7' Cincinnati Bickford Radial M.D.

CINCINNATI MACHINERY & SUPPLY COMPANY
218 E. Second St., Cincinnati, Ohio

NEW and REBUILT
STORAGE BATTERY
LOCOMOTIVES
1½ to 10 Ton 13" to 56" Track Gauge
GREENSBURG MACHINE CO.
Greensburg, Penna.

LOCOMOTIVES
1—6-Ton Gas Locomotive, 36" Ga., Milwaukee Locomotive Works
1—8-Ton Gas, 36" Ga., Whitcomb
2—25-Ton 0-4-0 Porter Saddle Tank Locos. Oil Burners, A.S.M.E. Code. Excel. Cond.
1—30-Ton, 0-4-0 Davenport, A.S.M.E. Boiler
1—35-Ton, G.E. Electric Loco., 250 volt, D.C.
1—50-Ton 0-6-0 Vulcan Locomotive
2—60-Ton, Baldwin-Westinghouse Electric Locomotives, 1500 D.C., New 1927
1—60-Ton Westinghouse Electric, 550 V. D.C.
1—65-Ton 2-6-0 Mogul Loco. Oil-burning
1—70-Ton 0-6-0 Baldwin Switching ICC cond.
3—80-Ton, 0-6-0 Lima Switching Locos. T/E 35,300=. Built 1925 and 1927
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48"	8	1/8"	1/16"	20"	5	1/8"	1/32"
42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

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TRANSMISSION BELTING
HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

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RUBBER HOSE
WATER HOSE
Each Length with Couplings Attached

I.D. Size	Length	per Length
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1"	50 "	8.00
	25 "	6.25
1¼"	50 "	12.00
	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE

I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

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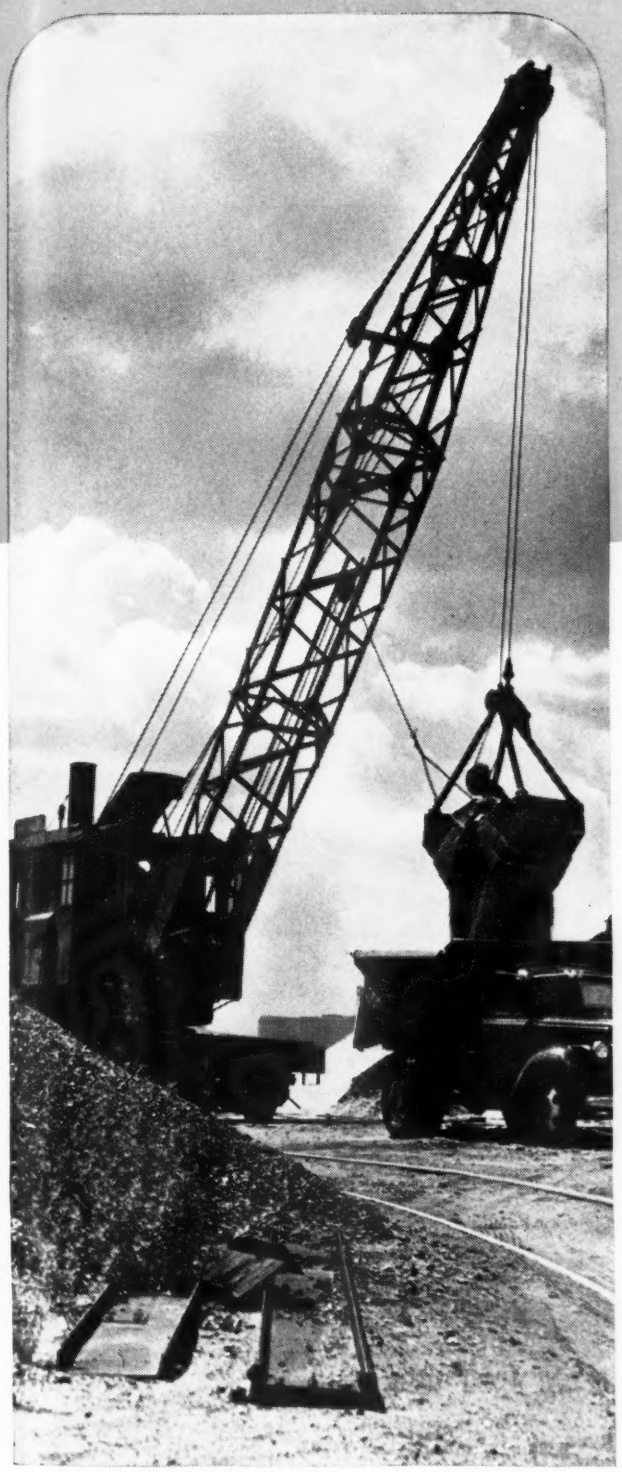

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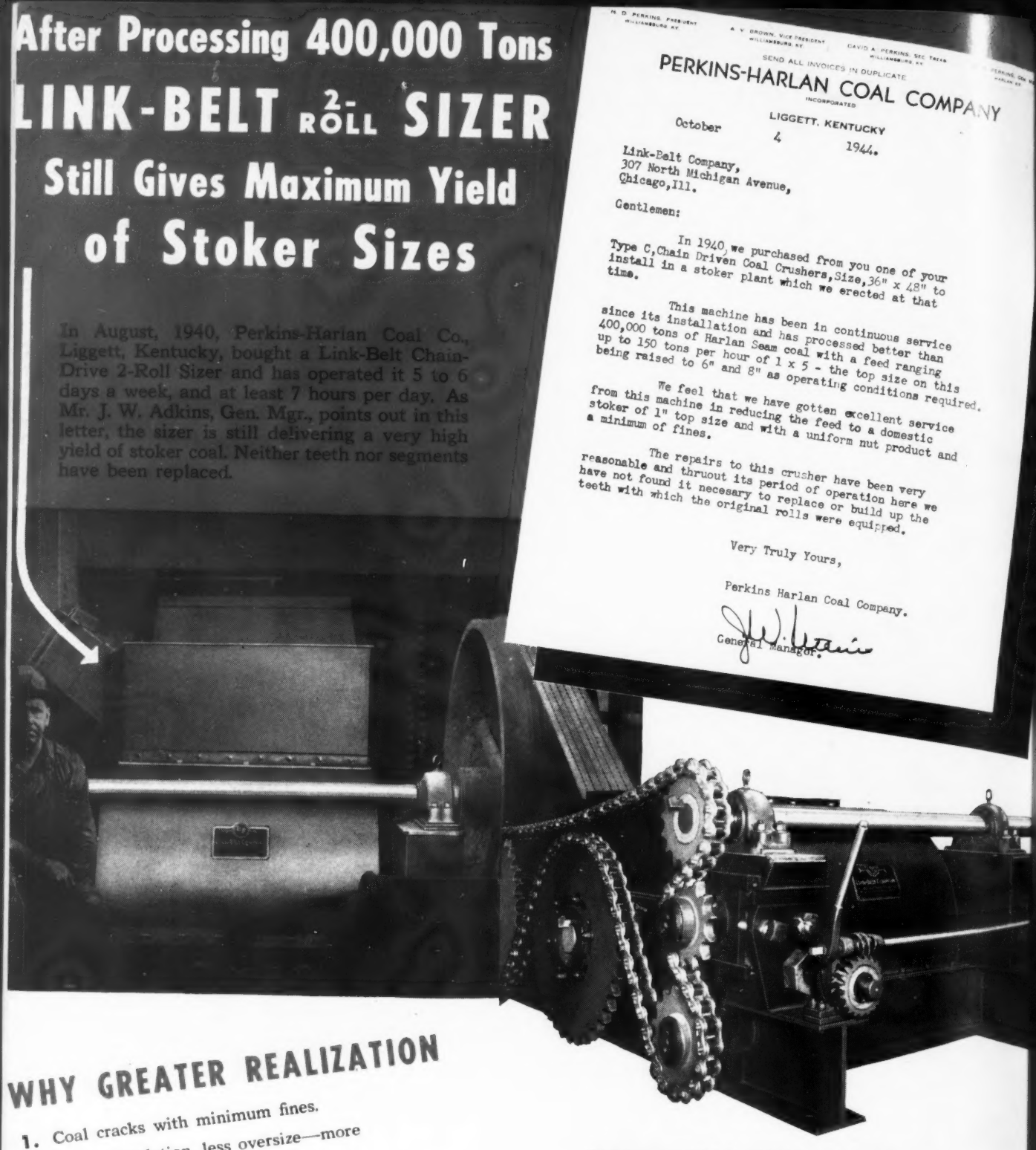
Still Gives Maximum Yield of Stoker Sizes

In August, 1940, Perkins-Harlan Coal Co., Liggett, Kentucky, bought a Link-Belt Chain-Drive 2-Roll Sizer and has operated it 5 to 6 days a week, and at least 7 hours per day. As Mr. J. W. Adkins, Gen. Mgr., points out in this letter, the sizer is still delivering a very high yield of stoker coal. Neither teeth nor segments have been replaced.



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PERKINS-HARLAN COAL COMPANY
INCORPORATED
LIGGETT, KENTUCKY

October 4 1944.

Link-Belt Company,
307 North Michigan Avenue,
Chicago,Ill.

Gentlemen:

In 1940, we purchased from you one of your Type C, Chain Driven Coal Crushers, Size, 36" x 48" to install in a stoker plant which we erected at that time.

This machine has been in continuous service since its installation and has processed better than 400,000 tons of Harlan Seam coal with a feed ranging up to 150 tons per hour of 1 x 5 - the top size on this being raised to 6" and 8" as operating conditions required.

We feel that we have gotten excellent service from this machine in reducing the feed to a domestic stoker of 1" top size and with a uniform nut product and a minimum of fines.

The repairs to this crusher have been very reasonable and thruout its period of operation here we have not found it necesary to replace or build up the teeth with which the original rolls were equipped.

Very Truly Yours,

Perkins Harlan Coal Company.

J. W. Adkins
General Manager.

WHY GREATER REALIZATION

1. Coal cracks with minimum fines.
2. Less degradation, less oversize—more premium size.
3. Proper tooth design and spacing.
4. Slow roll speed.
5. Quick, accurate changes of roll settings can be accomplished by push button control.
6. Simple, compact design saves space.
7. Unbreakable, all-welded steel frame.
8. Smooth, quiet operation.
9. Low maintenance cost.
10. Less power for driving.

MECHANICAL ROLL ADJUSTER

Gives Greater Flexibility. Saves Time—Increases Output. Where frequ adjustments of roll settings are required, considerable saving can be ma with the Link-Belt mechanical roll adjuster which can be furnished. It available in two types—power and hand operated. Let us tell you m about this feature of the Link-Belt 2-Roll Sizer.

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